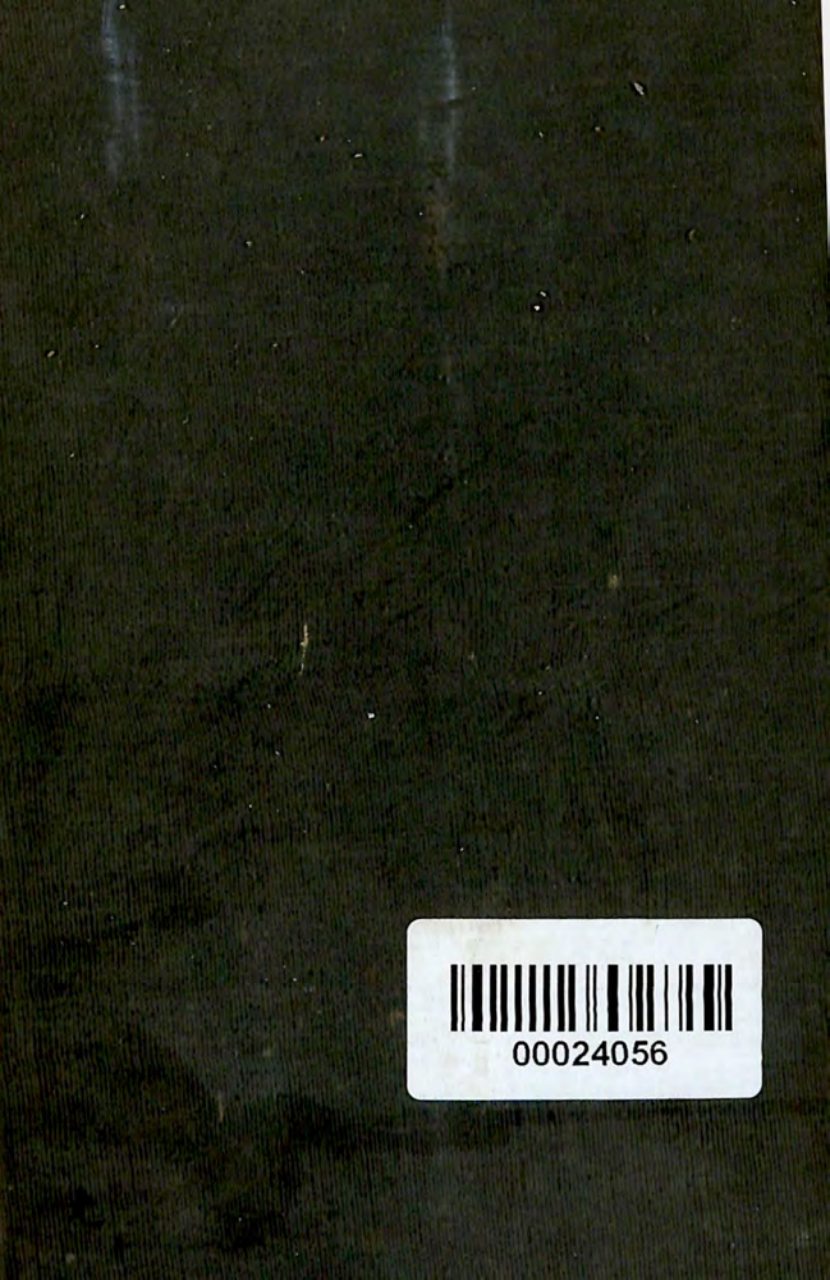
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PALISSY THE POTTER.

THE LIFE

OF

BERNARD PALISSY, OF SAINTES,

HIS LABOURS AND DISCOVERIES IN ART AND SCIENCE;

WITH AN OUTLINE OF

HIS PHILOSOPHICAL DOCTRINES,

AND A TRANSLATION OF

ILLUSTRATIVE SELECTIONS FROM HIS WORKS.

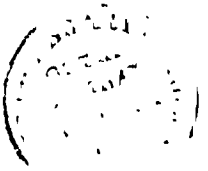
BY HENRY MORLEY.

24056

"Je n'ai point eu d'autre livre que le ciel et la terre, lequel est connu de tous, et est donné à tous de connoistre et lire ce beau livre." PALISSY.

IN TWO VOLUMES.

VOL. II.



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PALISSY THE POTTER.

CHAPTER I.

PALISSY RESCUED—THE DEDICATION OF HIS SECOND BOOK.

IMPRISONMENT of Bernard Palissy implied stoppage of decorative works upon the premises of many wealthy people. Palissy put to death meant the extinction of an ornamental art. Great men required the service of the Potter, and stretched forth their hands, therefore, to withdraw him from the gallows. Perhaps they were incited to their efforts by his virtue also.

Palissy in Saintes had been protected by the leading men of either faction. By the Catholics it was well known that he worked for Montmorenci, in a building that had been erected for him partly by the constable himself; he held also a document, signed by the Duke of Montpensier, forbidding the authorities "to take cognizance of or undertake anything against him or his house." This had been

conceded for the express purpose of ensuring the completion of the work in progress for the Constable Montmorenci. To the reformers it was known not only that he sympathised in their religious views, but that the Count de la Rochefoucault had forbidden all intrusion on the workshop of the artist.

Nevertheless, Bernard had been prosecuted by the dean and chapter of his town—men, he says, "who have none occasion against me, except in that I have urged upon them, many times, certain passages of Holy Writ, in which it is written that he is unhappy and accursed, who drinks the milk and wears the wool of the sheep, without providing for it pasture. And by as much as that ought to have incited them to love me, they have therein made for themselves occasion to desire that I should be committed to destruction as a malefactor; and it is a true thing, that if I had depended on the judges of this town, they would have caused me to be put to death, before I should have been able to obtain any assistance."

The Sire de Pons and his lady—the Sire de Pons being king's lieutenant in Saintonge—had interfered in time to prevent the complete annihilation of the workshop of Palissy, which had been decreed by the wise men of Saintes in their town-hall. But Palissy was carried off "at night by bye-roads to Bourdeaux." From the parliament of Bourdeaux he could have no mercy to expect, and once at Bourdeaux, the only rescue that would be available must be the king's hand stretched out from the throne. The

king's lieutenant in Saintonge, the Sire de Pons, had power to control the justices of Saintes; but the parliament of Bourdeaux, in its district, swayed the powers of the king, and the justices of Saintes well knew that if they could carry Palissy to Bourdeaux, and there place him at the mercy of the parliament, the interference of the king himself alone could save him.

The Sire de Pons immediately exerted himself; the Seigneur de Burie and the Seigneur de Jarnac were equally prompt to communicate with Montmorenci. Palissy, in a dedicatory epistle to his great patron, the constable, quietly assigns the motive of their zeal in his behalf. He had said how the Duke de Montpensier gave him a safeguard, "well knowing that no man could bring your work to a completion but myself." He adds, that when he was imprisoned, the above-named seigneurs "took great trouble to cause me to be delivered, with the design that your work might be completed." If Palissy had not acquired his secret as a potter, if his death had not meant the extinction of an ornamental art, in that year 1562 he would have died upon the gallows.

Montmorenci, being suddenly informed by his good friends upon the spot of the fate that threatened the ingenious Potter, Master Bernard, lost no time in addressing the queen-mother, and securing the safety of his workman. Queen Catherine, who would, of course, in so trifling a matter oblige the great constable, had also a taste for the patronage of clever artists. An edict was therefore issued

in the king's name, appointing Palissy inventor of Rustic Figulines to the king and to the constable. This removed him from the jurisdiction of Bourdeaux; for, as a servant of the king, his cause could come under no other cognizance than that of the grand council. By the same edict Palissy received also, of course, such encouragement as public honour might afford him in the prosecution of his art. The court protected Master Bernard not because he was a shrewd observer, a good naturalist, or a pure-minded reformer; the honour of its protection was bestowed on Palissy the Potter, worker in earth; according to his own designation of his calling, "Worker in Earth, and Inventor of Rustic Figulines."*

The men who have just been named as intercessors for the life of Palissy, were men of mark in their own time, whose names are constantly recurring in contemporary records which extend over a large part of the sixteenth century. The Seigneur de Burie was an old man who had fought in Italy, and whose name has already occurred upon these pages, in connexion with the early campaigns of Montluc. He belonged to an ancient house of Saintonge, and was now lieutenant-general of the king in Aunis, under the orders of Antony, King of Navarre. The Seigneur of Pons, which is a town not far from Saintes, was, as we have seen already, the king's lieu-

* "Ouvrier de Terre, et Inventeur des Rustiques Figulines." The meaning of the term, "Rustic Figuline," has been explained in a preceding chapter. Vol. i., page 212.

tenant in Saintonge. He was also Count of Marennes, the famous salt-district. The Seigneur de Jarnac, Governor and Seneschal of Rochelle, was a veteran soldier, chiefly famous for his duel, fifteen years before this civil war, with the Seigneur de la Chateigneraie. As the story of that duel illustrates the times, it may be worth narrating.

In the last year of the reign of Francis I., scandal arose at court, which very much concerned the Dauphin Henry. Jarnac had communicated to the dauphin flattering intelligence from a great lady of the court, which the imprudent dauphin had confided to some friends. His friends increased the circle of the revelations, and the enemies of the great lady, hearing the story, published it abroad, and made the best or worst use of it they could against her. The king, incensed, proceeded to inquire with whom the scandal had originated. The dauphin, who was no great favourite with his father, and had fallen recently into disfavour by seeking the recal of Montmorenci, dared not avow his fault. To check further inquiry, a friendly knight, the Seigneur de la Chateigneraie, stepped forward and declared that the unwelcome rumours had originated with himself. Chateigneraie was one of the two or three most formidable knights in a court that laid the greatest stress on chivalry, and was accordingly a favourite companion of the king. He could literally take a bull by the horns, and felt, therefore, that he incurred little risk in doing so metaphorically in the present instance, to protect the dauphin. Jarnac felt

compelled to challenge the camp Hercules, who, with the true instinct of a game-cock, crowed in advance over an easy victory. The challenge was of course accepted, and King Francis dying, the combat, which took place at sunset, in the park of St. Germain en Laye, before the new King Henry and the assembled court, was one of the first acts at which Henry assisted after his accession to the throne. Chateigneraie, who could hurl his lance into the air and catch it three times in succession, while he galloped at full speed over a plain, prepared a feast beforehand in his tent to celebrate his victory. Jarnac was accounted a doomed man, but by a dexterous stroke, known to this day in duels as the *coup de Jarnac*, he wounded his opponent in the ham, and vanquished him completely. Chateigneraie lay bleeding under the sunset on the greensward of the park, and was carried thence, not to the feast prepared within his tent, but to the bed on which he was to while away the few remaining hours of life. The laurels of this victory were always green upon the head of Gui de Chabot Jarnac, who now, some fifteen years after the duel, united with the Sire de Pons and the Seigneur de Burie in intercession for the life of Bernard Palissy.

It is a coincidence of no very startling character, although perhaps worth naming, that the edict against reformers, under which Palissy was arrested, had been dated by Henry II. from Ecouen, in June, 1559; while it was from his own labours at Ecouen that Palissy derived the patronage which saved his life.

Palissy, saved from the power of the parliament* of Bourdeaux, and being thoroughly protected now against hostility from the belligerents on either side, returned to his family, and quietly resumed his occupations in the half-depopulated town of Saintes. Churches had been battered, and antiquities destroyed. Friends of the Potter had been slaughtered in the streets, or sent to die upon the gallows. The workshop of Palissy had been thrown open to the sky, and its broken doors invited the intrusion of the people. Bernard made the requisite repairs, and wiped away the traces of the interruption, while he not only resumed his old work, but also his old habits among the woods and fields, and his old way of speaking freely what he felt to be the truth. The prison of Bourdeaux, and his near escape from death, inspired him with so little terror, that the first months of recovered liberty were occupied in seeing through the press of Barthelemi Breton,

* The word "parliament," which occurs often in this narrative, must not incautiously be taken in our English sense. There were in France thirteen parliaments, sovereign courts, lay and ecclesiastic, high courts of appeal for their respective districts. There were attached to them notaries, attorneys, fiscal attorneys, attorneys-general, &c., each court having, of course, a president. They had cognizance of civil and criminal cases, made special laws, and represented to those under them the power of the king. The most ancient, and for a long time the only parliament, was that of Paris, which gave immediate assistance to the king in his deliberations, and both by seniority and influence deserved the first rank among others of its kind. It was often spoken of simply as "*The* Parliament." Other parliaments were instituted in different provinces at different dates; that of Bourdeaux was the fourth, but the exact date of its establishment is unknown.

at Rochelle, a little book which he proposed to dedicate to the queen-mother and the Constable Montmorenci, and in which, among other matter, he did not scruple to utter with the utmost freedom his opinions as a Huguenot. No man had any right to put his mind in fetters, no man had power to make Palissy afraid, and so the simple-hearted Potter thought and spoke what seemed to him the necessary truth with tranquil honesty.

The book which Palissy, after his rescue from prison, busied himself in seeing through the press, contained treatises on four subjects, namely, agriculture, natural history, the plan of a delectable garden, to which is appended a history of the troubles in Saintonge, and the plan of a fortified town, which might serve as a city of refuge in those times of trouble. The treatises, containing part of the experience of his past years, had probably been written before his imprisonment, since it is only in his prefatory matter that he has made reference to that event. The book into which they are collected, in which one of the leading objects is to instruct men to avoid the enormous waste occasioned to the fields by defective care of the manure, is thus entitled: "A Trustworthy Receipt, by which all the men of France may learn how to multiply and augment their Treasures. *Item.*—Those who have acquired no knowledge of Letters, may learn a Philosophy necessary to all dwellers in the earth. There is also contained the design of a Garden as delightful and useful in invention as ever has been seen, with the design

and arrangement of a Fortified Town, the most impregnable of which men have ever heard."* This book was published in a quarto form at Rochelle, by Barthelemi Breton, in the year 1563, being the year succeeding that in which Palissy had been committed to the dungeons of Bourdeaux.

The prefatory matter in the first pages of Bernard's book, his second book, according to his own phrase, but the first of which there remains to us authentic information, includes the usual modicum of recommendatory verse. This verse is of the usual quality. "F. B. to Bernard Palissy, 'his singular and perfect friend,' and to the reader," rhymes in a way that deprives us of all curiosity to ascertain the other letters of his name. Pierre Sanxay, to a quick tune, dances before the book with a most lusty song of praise. "Through all past ages," he says, "Nature, mother of things, these heaped treasures has hidden under her wings. Man when he was a child, with wonder could not fill us.

* Recepte Véritable, par laquelle tous les Hommes de la France pourront apprendre à multiplier et augmenter leurs Thresors. *Item.*— Eux qui n'ont jamais eu connoissance des Lettres, pourront apprendre une Philosophie nécessaire à tous les habitans de la terre. Plus y est contenu le dessein d'un Jardin autant délectable et d'utile invention qu'il en fût oncques vu, avec le dessein et ordonnance d'une Ville de Forteresse la plus imprenable qu'homme ait jamais ouï dire." To make the title more attractive, a publisher who issued the works of Palissy, in 1636, Robert Fouet, entitled them all, "How to grow Rich"—"Le Moyen de devenir Riche," and "La Manière véritable par laquelle," &c. Several French writers, and Voltaire among them, knowing the works of their great Potter only by this title, have leapt to the conclusion that he was an alchemist!

Hercules, or Adam's nephews, built a pair of pillars; Greece has gotten credit for some Caryatides, Egypt for the bigness of her Pyramids; we remember the Carian sepulchre, and the ancient amphitheatre crowns Cæsar with glory; but none of those things come near the Rustic Figulines: they are so well painted, and so ingeniously imagined. The before-named trifling works, namely, the Straits of Gibraltar, the monuments of Greece, the Pyramids, and the Coliseum, required thousands of makers, but the best of them was not equal to a basin made by you, Palissy, alone. The best of them has been bettered by eloquence, but yours are better than the powers of speeech. The ancients counted seven wonders in the world; had they seen yours, it would have ranked before the first. Apelles painted better than Parrhasius, Parrhasius better than Zeuxis; but you beat them all. The high and thick rock pours no clearer water than that which you pour in a mimic fall."

At this point Pierre Sanxay becomes luminous. I have quoted the matter of his praise thus far, as an amusing illustration of what used to be done in the old days, when no book could go abroad respectably unless, like the ark of the covenant, it had some worthy men to dance before it, singing songs of triumph. But Pierre begins now to be particular in his laudation, and to specify some works of Palissy which he holds to be peculiarly superior to the Straits of Gibraltar and the Pyramids. We have already referred to the rustic grotto erected by Palissy for Mont-

morenci, in the gardens of Ecouen, the site of which was afterwards known as the Fontaine Madame. There can be little doubt that the reference of Pierre Sanxay is now to this device. The rock from which the cascade fell was entirely and literally made by Bernard, being a grand specimen of his painted pottery. Rustic figulines of frogs and fishes were placed in and about the water, lizards were put upon the rock, and serpents scattered in the grass. The allusion to Apelles and Zeuxis may very possibly have been suggested to the mind of Pierre Sanxay by a connexion between the story of the grapes by which the birds were cheated, and the figure of a dog modelled and painted by Bernard, and placed at his workshop-door, which had been invited out many times to single combat by perplexed dogs belonging to the town.

Alluding to such works, and probably with a direct reference to the grotto at Ecouen, Pierre Sanxay goes on to say to the author of the "Trustworthy Receipt:" "A Tarentine Archytas made the flying dove; but you make, in argentine course, a troop of fishes swimming.* The frogs in a pond are not more infinite; but your frogs do not need to croak, for they are seraphim. Megæra to the hideous chief took baleful serpents; but you, not less ad-

* It would be easy to make mimic-fishes that would float and dance about in water agitated by a cascade; but the poet has probably fallen a victim to the illusion which Bernard tells us he wished to produce, by placing on the margin of his fountain enamelled fishes, similar in appearance to the living creatures that were set to swim about in the transparent water.

venturous, make serpents things of light. The lizard on the moss has not more native lustre than the lizard in that house which is made famous by your new work. The herbs look not sweeter in the fields, and green meadows are not more preciously enamelled, than those which grow under your hand. Cold, moisture, and heat, wither all other herbage; whatever may be the weather, yours can take no harm. I will be silent now, and only say that of a better treasure your rich nature gives us revelation in yourself."

Therein we may heartily agree with Pierre Sanxay; for in the book to which his verses are prefixed, there is no higher charm than that which we derive from the pure, natural outpouring of Bernard's mind. In a book published fifteen years later we find the results of his matured experience, and the whole sum of his acquirements as a naturalist who had pushed forward far beyond the knowledge of his time. In this book we find Bernard labouring onward, writing in the simplicity of an unlettered man, whom God has gifted with a quick and subtle genius, who, with the perfect mind of a philosopher, and fearlessness of manly thought and speech, is naïve and single-hearted as a little child.

The letters written after his release, by Palissy, and prefixed to his book, are addressed respectively to the constable and to his son, to the queen-mother, and to the reader. To the eldest son of the constable, the Marshal de Montmorenci, Governor of Paris, the first letter speaks;

and it commences with an idea repeated solemnly by Palissy in other writings, which was, indeed, the mainspring of his intellectual machinery. The parable of the Talents —the duty of every man placed in the world to see how he might turn all his powers to account, and do the utmost good of which his mind was capable—was the touchstone by which Bernard tried the temper of his industry. This religious feeling, aiding and strengthening his natural activity of mind, forced Palissy to pursue with energy every path by which he thought he could arrive at truth. He never remained satisfied with what was done, for there was always more to do. He laboured ever forward in his art; he studied nature, not as a recluse, but as a man ready to seek every opportunity of turning his discoveries in science to the practical advantage of his race. He saw that if men kept honest, local records, history, would be more correct, and therefore he narrated the events of his own town. He saw errors in Church discipline, which caused misery and strife, and he proclaimed honestly all that he saw. Having finally acquired much knowledge, and eliminated what he thought to be some valuable practical ideas, from the spreading of which over the country good would follow, it became his duty to spread them if he could, and that was his first motive for the publication of his book.

He did not profess indifference to either praise or profit. His mind was too healthy to be ashamed of any just and natural desire. He would be very glad to be entrusted with any profitable commission, and without hint-dropping

or circumlocution, whenever it occurred to him that he could be useful to somebody with profit to himself, he wrote what he thought in his own honest, unaffected manner.

For inscribing his first letter to the Marshal de Montmorenci, the eldest son of his great patron, Palissy may have had several motives. The son of the constable represented less perfectly than his father the faction of the triumvirate; he had endeavoured to dissuade the old man from his coalition with the Guises; and differing not very much in age from Palissy, at the same time that he was liberal in temper, Palissy felt for him, as perhaps he felt for Palissy if they had met often at Ecouen, beyond the relation of patron and client, a good deal of human liking. Then again, by addressing his first letter to the younger Montmorenci, Palissy could address the queen-mother afterwards with greater delicacy. He shrank altogether from the fiction of a grateful letter to the king, nor did he wish, by writing to the queen-mother on his first page, coarsely to thrust himself before the notice of the throne. To have placed his epistle to the queen after that which he addressed to the elder Montmorenci, considering the great power and influence of the old constable, would have been a precedent that might have suggested to the queen herself distasteful reflections. The less prominent son of the marshal was, therefore, chosen to stand in the first place among his dedicatory letters; after that, he paid his humble duty to the queen and constable. These considerations would be strengthened by the dictates of self-

interest, which would suggest the marshal as a very likely man to trust the workman whom his father trusted. There was some hope that he might give Bernard commission to execute that design for a delectable garden which the book contained, and to which the straightforward Potter solicited his practical attention. Again, the heir of the old constable and of the estate at Ecouen was a man whose friendship it became the interests of Palissy to cultivate, if he could do so in any honourable way. I have suggested a variety of possible motives, and more could be adduced if it were worth while, for few men act in any way upon a single motive only. Therefore, when men are asked what was their reason for an act, the question ought almost invariably to be, what were their reasons? and when for their reply they give a single motive, they often misrepresent even themselves, because they are unable to reproduce in a few words, if they are able to recal, a complex process of the mind.

Palissy then addressed the first dedication of his book to Monseigneur the Marshal de Montmorenci, Knight of the Order of the King, Captain of Fifty Lances, Governor of Paris and the Isle of France. Commencing with the sense of religious responsibility, he gravely expresses his feeling that God has commanded men to eat bread by the labour of their bodies, and that they should multiply the talents which He had committed to them, in accordance with His testament.

"Which having considered, I have not been willing,"

he says, "to hide in the ground those talents which it has pleased Him to allot to me; therefore, to cause them to bring profit and increase, according to His commandment, I have been desirous to produce them before every one, and especially before your lordship, knowing well that by you they would not be despised, though they have, indeed, proceeded out of a poor treasury, being held by a person very abject, and of low condition; this notwithstanding, since it has pleased my lord the constable, your father, to do me the honour to employ me in his service, for the building of an admirable rustic grotto of new invention, I have not feared to address to you a portion of the talents which I have received from Him in whom all gifts abound."

These talents he proceeds to explain are, first, certain "good secrets" concerning agriculture, which he publishes, desiring "to excite good-feeling in all men towards the earth, and to make them lovers of virtue and just toil." He also desires, in connexion with this subject, to point out certain errors in farming, the amendment of which would "be the means of enabling men to gather more than four million bushels of grain yearly in France above what is customary, provided that they be content to follow my advice, which I hope that they who are subject to you will do when they have received the information given in this book."

Palissy then states that his book contains also original plans of a garden and of a fortified town. He says, "I have

not put a picture of the said garden in this book, because there are many who are not worthy to see it, and especially the enemies of virtue and good wit; and also my indigence, and the occupations of my art, have not permitted." Palissy had often, probably, described in conversation some parts of his great garden idea, and been pronounced in that, as in many other of his schemes, a visionary. He proceeds to rebut this notion; and as to the picture, he adds, "Whenever it may please you to employ me in this affair, I will not fail to provide you quickly with a picture, and even will put the plan into execution, if you should feel inclined to have this done."

He then foresees objection that may probably arise against the reception of a scheme of fortification from a Potter, who has had no experience in batteries or the assault of towns. "To this I reply, that the work which I have begun for my lord the constable gives witness enough of the gift which God has given me, to close their mouths; for if they inquire into it, they will find that such a work has not before been seen. *Item.*—Having made more ample inquiry, they will find that no man has taught me to understand the details of the above-named work. If, then, it has pleased God to distribute to me of his gifts as an artist in earth, who will deny that He has also sufficient power to communicate to me a portion of understanding in the military art, which is acquired rather by nature, or natural sense, than by practice?" (There was little science in it in the days of Palissy.) "The for-

tification of a town chiefly consists in tracings and lines, according to geometry ; and it is well known that, thanks to God, I am not ignorant of these things. I have assumed the boldness to propose to you these arrangements, in order to obviate the detraction of some who might persuade you by saying that the thing is impossible." Bernard is quite convinced that his fortress is impregnable, and is ready to stake his life upon the truth of his invention. It may be observed in advance, that the impregnability of Bernard's fortress by any means available against it in those days is perfectly demonstrable, but the adoption of it, as we shall hereafter see, would have been open to fatal objection upon other grounds. The conclusion of the letter to the marshal well displays the elegant and nervous style which Palissy attained by speaking the clear thoughts of a man of genius in the words which they themselves suggested, without any strain for artificial polish. "If these things are not written with so much dexterity as is due to your greatness, you will be pleased to pardon me; and this it is my hope that you will do, seeing that I am not Greek, nor Hebrew, nor poet, nor rhetorician, but a simple artisan, poorly enough trained in letters: this notwithstanding, for such reasons, the thing in itself has not less value than if it had been uttered by a man more eloquent. I had rather speak truth in my rustic tongue, than lie in rhetoric. Therefore, my lord, I hope that you will receive this small work with as ready a will as I have a desire that it shall give you pleasure."

The clearness with which thoughts presented themselves to the lively apprehension of the Potter, led him at all times to speak them in words accurately fitted to his meaning. For this reason the French written by Palissy three centuries ago has very little of an antiquated cast; his language, like his mind, appears to have marched forward out of his own time.

The next epistle, addressed by the liberated Potter "To my very dear and honoured lady, Madame, the Queen-Mother," relates how, when he had been delivered from the hands of his cruel enemies by her "means and favour, at the request of my lord the constable," he reflected that it had been ungrateful in men to imprison him for admonishing them to their own advantage. And then, considering whether there might not be in himself also some spirit of ingratitude, he remembered the favour of the queen, "which seeing, I found that it would be in me a great ingratitude if I were not regardful of such boon. Nevertheless, my indigence has not permitted that I should transport myself into your own presence to thank you for such boon, which is the smallest recompense that I could make." It is not at all probable that in the most prosperous time of his life Palissy was rich. The art of pottery, especially to one who does not labour by the light of past experience, is very costly. The spoiling of elaborate work in the furnace, loss of much material and time and labour, is a frequent accident; and Palissy, who always laboured forward into unknown regions for increase

of skill, was of course always paying for his knowledge by mishaps attendant on his spirit of adventure. If he had hoarded any little store, it would have been consumed during his imprisonment, and the last coins of it were probably expended in the repair of damage that had been done to his workshop by his enemies. The expense of publishing his book, and travelling upon that business between Saintes and Rochelle, would further burden him; he might well, therefore, plead indigence as his apology for not incurring the expense of an appearance at the court. He offered to the queen, however, the secrets contained in his book.

"My littleness," he says, not without so much just pride as elevates him far above the host of sycophants—"my littleness has not dared to take the liberty of dedicating my work to the king, knowing well that some would say that I had done this for the sake of being recompensed: if it had been so, it would have been no new thing. Madame, there never was a time when good inventions received their reward from kings; nevertheless, I have hope that this work will be more useful to the king than to any other person. At the same time, because of my littleness, I have dedicated it to Monseigneur de Montmorenci, good and faithful servant of the king, which I hope he has found means to make very well understood by his sovereign prince and king." Having put in this good word for the marshal, Palissy propounds an idea for himself. There was no affectation of independence in

Bernard's expression of a feeling which, in our own country, at any rate, artists share with him to the present day: "Madame, there never was a time when good inventions received their reward from kings." That was a plain truth, but Palissy does not affect to disdain patronage. It occurs to him that he should be glad to have a little work in one of the queen's gardens; that being a natural and honest object of desire, Bernard has no false delicacy in expressing it. "There are things written in this book," he tells the queen, "which will be able to assist much in the building of your garden of Chenonceaux; and if it shall please you to command me to do you service therein, I shall not fail to employ myself about it. And if you should feel inclination to do this, I will do things that no other man has done up to the present day." The works from his furnace being unique in their character, of course that promise would have been extremely easy of fulfilment.

In his epistle to his great patron, the constable, Palissy first excuses himself for not having rendered thanks at the time when he was drawn "out of the hands of his mortal and capital enemies. You know," he says, "that the occupation of my time upon your work, together with my indigence, have not permitted it. I doubt whether you would have found it good, if I had quitted your work to bring you large thanks." Palissy then narrates to the constable briefly the cause and manner of his arrest. He accounts for his continuance at Saintes during the heat

of the contention, and after his enemies possessed the town in triumph, by saying, "I should have taken good heed not to fall into their sanguinary hands, had it not been that I hoped they would have regard for your work, and for their duty to Monseigneur the Duke de Montpensier, who gave me a safeguard, forbidding them to take cognizance of, or undertake anything against me or against my house; well knowing that no man could bring your work to completion but myself." After telling the tale briefly, he adds: "I have written to you all these things, in order that you might not be of opinion that I had been imprisoned as a thief or murderer."

Addressing in the last place the reader, he prays to him in a friendly manner, "Be not so indolent or rash as to content yourself with the reading of the beginning or a part thereof; but, in order to carry away from it some fruit, take pains to read the whole, without having regard to the littleness and abject condition of the author, nor yet to his language, rustic and ill-adorned, assuring yourself that you will find nothing in this writing which is not of profit to you, more or less." Applying presently his main idea, and praying his reader "to call to mind a passage which is in the Holy Scripture, there where St. Paul says, that each one according as he has received gifts should distribute thereof to others," he urges upon him the duty of instructing his unlettered labourers, "that they may be made carefully to study in natural philosophy, according to my counsel." The instruction of

agricultural labourers in natural philosophy is an idea that sounds speculative enough even in the present day. But Palissy was right; his notion was clear-sighted and practical. If farmers had gifts of knowledge to distribute to their servants, they could raise them very quickly in the scale of intellect, and there is no knowledge so easy of acquisition and so interesting to unlettered men as plain and useful information on the meaning of the processes of nature. If labourers were taught to know the reason that is in their daily labour, and the ways of nature which it is their occupation to assist, they would not only work more happily and blunder less, but would contribute in some independent ways to the advance of agriculture.

"Especially," says Bernard, "let that secret and precept which concerns manure-heaps, that I have put into this book, be divulged and made manifest to them; and that also," he adds, allowing for the slow perceptions of the ignorant, "so long as may be needed, till they hold it in as high esteem as the thing merits. Since so it is, that no man could estimate how great the profit in France would be, if on this subject they would accept my counsel." Palissy then mentions "a kind of earth called marl," which he had seen used as manure "in certain parts of Gascony, and some other regions of France." This subject he promises to investigate and treat of in a third book, "if I see that my writings are not despised, and that they are put in execution."

After again defending, as quite practicable, his ideas for

the garden and the fortress, Bernard's epistle to the reader thus continues: "I have also found so much ingratitude in many persons that this has caused me to restrain myself from too great liberality; at the same time, the desire I have toward the public good will incite me some day to take an opportunity of making the picture of the said garden, according to the tenour and design written in this book. But I would like to beg of the nobility of France, that after I shall have occupied my time to do them service, it will please them not to return me evil for good, as the Roman ecclesiastics of this town have done, who have desired to get me hung, for having sought on their behalf the greatest good that could accrue to them, which is, for having wished to incite them to feed their flocks, following God's commandment. And no man can say that ever I have done them any wrong; but because I urged upon them their perdition, according to the eighteenth of the Apocalypse, seeking thus to amend them, and because many times also, I had shown them a text written in the Prophet Jeremiah, where he says, 'Woe unto you, pastors, who drink the milk and wear the wool, and leave my sheep scattered upon the mountains! I will demand them again of your hands;' they, seeing such a thing, instead of amending, hardened themselves, and banded themselves together against the light." The simple, earnest Potter, who seems to have regarded it as a plain duty to expostulate with the well-dined ecclesiastics of his town, to urge upon them their perdition, and awaken them, if pos-

sible, with the solemn note of texts that pronounce woe against unfaithful pastors, speaks half in real, half in ironical surprise at the return he had for all his good intentions. "I never should have thought," he tells his reader, "that for that cause they would have wished to take occasion to put me to death. God is my witness, that for the evil they have done to me they had no other occasion than the above named."

Finally, Bernard commends to all his readers agriculture as "a just toil, and worthy to be prized and honoured;" and again, urges his desire "that the simple may be instructed by the wise, in order that we may none of us be rebuked at the last day for having hidden talents in the earth." With this last thought—a thought always predominant in his own mind—couched now in the most solemn form of adjuration, Palissy ends as he began his series of prefatory letters.

CHAPTER II

CONTENTS OF THE BOOK.

THE treatises included in the second book published by Bernard Palissy, the first that we are able to receive with confidence as his, having been published in the year 1563, when Bernard was fifty-four years old, contain the mature expression of his character. The maturity of his knowledge is expressed in later writings; in this second book we find him on the road to subsequent attainments, and it is in treating of his last work that we shall find the most fit place to consider the claims of Palissy to rank among the men who have won spurs upon the field of science.

The second book is chiefly interesting for the complete and lively way in which it makes a revelation of the entire mind of the writer. It is essentially original, and full of the charm conveyed by brilliant genius acting on its own impulses, in independence of all school-men, perfectly regardless of the prepossessions and the prejudices of the world. It presents the picture of a free mind and nimble

fancy working and playing on their own behalf three centuries ago, and pushing their own wholesome roots among the corruption of the soil in which they lived. Bernard, wandering among the woods with exquisite appreciation of all beauties of Nature,—searching among her secrets,—at one time applies his study to the ways of workers in the fields, and demonstrates how they may increase their substance by avoiding certain errors; at another time he contrasts the peace of woods and meadows with the jar of human strife, and dwells with playful satire on the follies, or with stern denunciation on the crimes of his own time. The intimate union in his writings between a love of nature and a spirit of unaffected piety; the cheerfulness of Bernard's piety as a pervading feature of his disposition, not incompatible in his case with the rigid sense of virtue and of discipline proper to a Huguenot who worshipped as he would in spite of the severest penalties, are characters that lie upon the surface. When he tells the story of the Reformed Church of Saintes, or comments elsewhere, as he always comments, freely on the great religious questions of the day, it should be observed, that however bluntly and sternly he may upbraid the ecclesiastics, he nowhere quarrels with them about dogmas of theology. He does not seem to care much whether they be good theologians or not, but he desires that they shall be good Christians only. He would have them to preach and take care for the poor; but he complains that they grow fat upon the substance of the people, and neglect

the fulfilment of their charge. He complains of avarice that cuts the forests down, of pride, contentiousness, and acts and passions that disgrace the Church of Christ. There can be little doubt that he adhered to the whole body of Calvinistic doctrine, but he does not trouble us with any syllable from which we can infer that he possessed a theologic passport properly filled up by Calvin, Beza, or any other ambassador of Heaven, for insuring his safe transit over the confines of this world. From the works of Palissy we only learn that he was thoroughly and reverently acquainted with the Bible, and that he laboured to apply its precepts practically to the regulation of his daily life. His reverence of Nature, and that inexpressible perception of the goodness equalling the wisdom of the Creator which is the best lesson that Nature teaches to her simple-hearted scholars, most effectually let the sunshine into Palissy's religion.

Palissy wrote without a thought of polished sentences; he never used his pen unless he had in his mind some matter worth inditing; and against his detractors he was not afraid to call to witness "the most cultivated minds of France—philosophers, and men who live well, full of virtue and good manners, who, I know, will hold my work in their esteem, though it be written in a language rough and ill-polished; and if they meet with a fault, they will know very well how to allow for the condition of the author."

The polish wanting in the works of Palissy is chiefly

that which in the present day would have been furnished to him by his printer. He poured out his thoughts more freely than his full stops. I have left untouched Palissy's punctuation, in such extracts from his writings as have been included in the present volumes; and for my own part, I like his works the better for the quaint vivacity with which the words follow each other, while the busy Potter quite forgets to measure the thoughts as they come out of his brain, against the wind that is demanded for their utterance.

Vivacity of mind prompted Bernard to plan all his writings in the form of dialogues, in which he represents as speakers Theory and Practice, or Experiment. His vivacity, his clear and philosophic spirit of inquiry, his strength of purpose, and the purity and grace communicated to his mind by long communion with nature and true wholesome piety, utter themselves in the works of Palissy, and reveal the character of the writer, many of his thoughts, and many of the circumstances of his life, without a trace of egotism. He hides, indeed, no sense of honourable pride, he affects no false modesty, but he causes us to delight in him and love him by the absence of all effort to acquire our admiration. His narrative of his struggles and sufferings while he was labouring in vain for the white enamel, is one of the best pieces, perhaps the best piece of naïve writing to be found in the whole range of modern literature. The fortitude which Palissy displayed during those efforts, is even less to be admired than the simplicity with which they are related.

This narrative of struggle is included, not in the second, but in the last of Bernard's books. In the Appendix to these volumes it is prefixed to a selection from the works of Palissy, designed to illustrate his life and character, in which selection, except some extracts from a short succeeding paper on "The Potter's Clay," the specimens have all been taken from the "Trustworthy Receipt," the book published in 1563, with which it is our present business to become acquainted. Since, however, portions of the book necessary to this story have been quoted in preceding chapters, and many portions so quoted will be read again, with the original context, where they occur in the Appendix, it will be sufficient now to give an outline of it; and whenever any extended details may be given in the words of Palissy, they will be such as are not elsewhere to be found included in these volumes.

The first and principal treatise in the book dedicated by Palissy to the constable and queen-regent, is upon agriculture. Palissy begins by the proposition of his garden, which he says had been suggested to him by the voice of certain virgins, who were seated under certain groves, and sang the Hundred-and-Fourth Psalm. Beginning at this point, the dialogue travels lightly over the troubles of the time, and the necessity of a place of refuge, until it dwells upon the defective cultivation of the arts, and chiefly agriculture. Bernard, who is no special believer in the wisdom of his ancestors, knows "that all folly, sanctioned by custom, is accepted for a law and virtue," but he "by no means desires to be an imitator of his predecessors,

except in as far as they have done well, according to the ordinances of God." In agriculture he says what is true, unhappily, to this day in many parts of France, of men who are born, as Palissy was born, in a peasant's station: —"Each labours on the soil without any philosophy, and all jog always at the accustomed trot, following the footsteps of their predecessors, without considering the nature or the prime causes of agriculture." Being cried out upon for the belief that labourers would be the better for some philosophy, Palissy emphatically reiterates his position, "dares well affirm, too, that if the earth were cultivated as it ought to be, one day would give the fruit which two give in the way that it is now cultivated daily."

To illustrate and enliven his case, he relates an ancient fable. His opponent then quotes Scripture to him against vain philosophies, and desires to know what kind of philosophy can serve a husbandman. Bernard disposes of the Scripture text, and then proceeds to give some practical explanation of the need of natural philosophy in farming, the study of soils, and waters, and such things. He passes on to explain the philosophy of manure, and points out, in language that would not discredit any modern chemist, the reason why all farmers in France wasted their own goods when they left their manure-heaps at the mercy of the rains. He talks philosophically about salts, preaching an agricultural doctrine common enough now, but at that time exclusively the product of his own reflection and research. His querist declares that for a hundred years' preaching he would not believe that

there is salt in muck-heaps; Palissy therefore proceeds to convince him, by a detail of experiments, that salt is contained in plants, not common salt, but salts of divers kinds, and that the manuring of a soil consists in restoring salts that have been removed from it by vegetation. It is by attention to these facts, and ceasing from the universal habit of allowing the manure to be spoilt by exposure, that Palissy proposed to all the men of France to multiply their treasures. To increase the productiveness of the soil, and to cheapen, accordingly, its produce, would have been to increase the wealth of every Frenchman. It is to this doctrine that Palissy refers in the first part of the title of his book.

Since he advises farmers to keep their manure from spoiling, he thinks it proper also to assist them by suggesting the plan of a tank for its reception, accompanied by such minute practical details, founded on a very sound philosophy, as will preserve them from all possibilities of error.

Having explained with great clearness this important doctrine, Palissy next proceeds to comment on the damage done by the labourers to trees through carelessness in wood-cutting. This "murder upon trees" he combats warmly, and teaches the necessity of cutting living plants in such a manner as to leave on them no bruise or fracture. The entire essay will be found in the Appendix,* with the omission of its two remaining topics. One of

* Where it is translated under the title of "How to Grow Rich in Farming."

these is a brief discussion of the cause of rottenness within the heart of trees, and certain appearances within the texture of wood, which are ascribed to the percolation of water that has been retained in hollows formed within the branches. The other topic is a more detailed discussion of the fit season for wood-cutting. Palissy properly points out that both the trees are less injured and the wood is better when it is lopped during the winter. He also very accurately describes the exhaustion of the resources of a plant by the act of flowering and bearing fruit; but at a time when the world knew nothing whatever about vegetable physiology, and there was need of a microscope for the perception of its truths, the reasoning of Palissy upon the facts he saw, though always sensible, could not, of course, always be correct. While distinctly and correctly teaching that the substance of a tree is drawn by its roots out of the soil, and consists largely of salts, Palissy errs in ascribing undue importance to the imbibition of moisture from the south and west winds as opposed to the dry cold winds from the north.

The second treatise in Bernard's book is devoted to the statement of certain opinions to which he had attained on natural history. In this essay he begins by recurring to his proposition that in all kinds of trees, herbs, and plants, there was salt; he adds now, that there are salts in stones and metals, which cause them to retain the solid form. The shape of mountains is due to the shape of the rocks beneath, which, being decomposed by air and rain, return

into the state of earth, and being in the state of earth, are never idle, but will produce thorns or thistles if no grain be sown. The valleys, being washed by rains and made too moist, lose a portion of their salts, which being more concentrated on the high lands, there produce stronger trees and fruits of better savour. For the savour of a fruit, he says, depends upon the salts within it, and that is a doctrine fully in accordance with the science of the present day.

Palissy then directs his disputant to take note of the crumbling of old walls, but is met promptly by a violent antagonism to his theory of the constant formation of new rocks, and disintegration of the surface of the rocks already formed. He is told that in the beginning God made heaven and earth; he made also the stones, and none therefore have since been made. This objection was no idle one three centuries ago. To the eyes of the orthodox these doctrines of Palissy concerning stones would appear utterly abominable and profane. The reply of Palissy to the dogmatist is very beautiful: "I know well that it is written in the Book of Genesis that God created all things in six days, and that he rested on the seventh; but for all that, God did not create these things to leave them idle; therefore each performs its duty according to the commandment it received from God. The stars and planets are not idle; the sea wanders from one place to another, and labours to bring forth profitable things; the earth likewise is never idle; that which decays naturally in her

she renews, she forms over again—if not in one shape, she will reproduce it in another. And that is why you have to take manure-heaps to the earth, in order that the earth may receive again the substance which she gave." So clear and extensive was the view of nature to which Palissy had risen since he was a child at play among the glass-workers.

He then speaks of the changes that take place beneath the surface of the earth—the formation of coal, of minerals, the kindling under the earth of fire "by some compression." He speaks of earthquakes, of the rising and sinking of mountains, as evidences of a constant change. If stones were not continually formed, he says, "it would be difficult to find at this day a horseload of them in a whole kingdom;" and he points out the daily waste of stone by man, by frost, and other causes.

Being required to give some further proof that stones are being at all times formed as well as wasted, he relates how he had been surprised when he for the first time found shells encrusted in a mass of stone, themselves being converted into stone. This, after much pondering, he then accounted for by the opinion that they were shells of fish that had been eaten by some former dwellers on the spot, and that the shells having decayed, "the substance and property of the salt of the said shells made attraction of the adjacent earth, and reduced it into stone with itself; however, because the said shells retained more salt in themselves than they gave to the earth, they congealed with

a congelation much harder." Afterwards, he had been puzzled by certain stones embedded in rock, "which were made in the fashion of a ram's horn"—ammonites, in fact —until "it happened one day that one named Pierre Guoy, citizen and sheriff of this town of Xaintes, found in his farm one of the said stones which was half open, and had certain dentations which fitted admirably one into the other; and because the said Guoy knew that I was curious in such things, he made me a present of the said stone, whereat I was greatly rejoiced; and from that time I understood that the said stone had formerly been a shell of a fish, which fish we see no more." Then he describes how he was once seeking shells upon the shore of Olleron, probably as models to be used in ornamental pottery, and had engaged a score of women and children to aid him in searching on the rocks; there were brought to him a number of fishes, which we know, from his minute description, not exactly under the class of Fishes, but of Radiata, as sea-urchins. "Now, some time afterwards," he says, "there was an advocate, a famous man, and lover of letters and arts, who, in disputing of some art, showed me two shells quite similar in form to the said urchin-shells, but which were quite massive; and the said advocate, named Babaud, maintained that the said stones had been carved by the hand of some workman, and was quite astonished when I maintained against him that the said stones were natural," and Babaud found it still more strange when Palissy proceeded to explain how such stones had been moulded into shells.

Palissy having in this way given evidence that all stones were not created in the beginning as they now exist, proceeds to discuss the veins of rocks and their cleavage. He ascribes the conversion of earth into stratified stone upon a large scale to pressure and the percolation of water, which becomes as it descends saturated more and more with salts. He ascribes faults in the strata to the check given to the percolation, in some parts, by the intervention of a piece of viscous earth. He accounts for the existence of white stone in black earth by the bleaching power which some salts possess. In this part of his philosophy Palissy falls behind the modern position of geology; but although incorrect, he is decidedly in advance of the philosophy of his own time, which in such matters rested satisfied with pious absence of inquiry.

The passage of water through rocks brings Palissy to the subject of springs, of which he proceeds next to detail the theory with perfect accuracy—a theory of which he stood alone in France as the discoverer.

Returning then to the subject of salts and flints, he proceeds to discuss the subject of crystallisation, and to relate how, in a cavern, a Grand-Vicar of Tours and Abbot of Turpenay had shown him flints formed about straw by congelation. He believes all flints to be formed in this way by deposit from water charged with the flinty salt. He has found flints with holes pierced through them, and by these has been confirmed in his theory, be-

cause they showed that the water had continued to run through while the flint was forming.

After further illustrating his theory of the deposit of stone from water, Palissy proceeds to speak of petrified wood, and relates how a piece of such wood, obtained at court by La Mothe Fenelon, was given to him as the said Fenelon was passing through Saintes;—he, like most other people who became acquainted with the philosophic Potter, "knowing," says Bernard, "in very good truth that I was very curious about such things." Palissy proceeds to account by his theory for the petrification of this wood in the swamp from which it had been taken, and adds, "you see, thus, how Nature no sooner suffers destruction by one principle, than she at once resumes work with another; which is that which I have told you throughout, that the earth and other elements are never idle."

Bernard then charges against his adversary another argument in further maintenance of his opinion that stones are undergoing constant reproduction as well as constant waste. Stones, he says, grow in human bodies, and are found to be produced in animals. In proof of his assertion that the moisture of the air is an active agent in producing the decay of stone, he speaks of the decay which takes place on the outside of the glass vessels in the churches of Poitou and Brittany. Glass was, at that time, much less perfectly compounded than it is in our own day; for long after the period of Palissy, we read, as a common

thing, of the action of an acid wine upon the wine-bottles. This decomposition Palissy properly ascribed to action on the salt contained in the glass—the alkali. "The glass-makers say that the moon has done this, but they will pardon me."

Palissy then, by a story of a potter, further illustrates the change of form which certain substances may undergo when salts are added to them. He then proceeds to discuss the formation of precious stones, and accounts for their existence still by the same theory of certain salts deposited from water, which had become charged with them in percolating through the earth. From a slight mention of metals he passes on to the absurd use of gold as a potable metal in medicine by the doctors. At the same time, he pauses to pay a grateful tribute to some members of the faculty, in words which rather militate against the theory that Palissy was author of the Dissertation that has been ascribed to him as his first work. "I have not spoken ill to you," he says, "of the doctors; I should be very sorry to do so, for there are some of them in this town, to whom I am greatly attached, and particularly to M. l'Amoureux, who has given me assistance with his worldly goods and with the labour of his art."

With a series of arguments against the theories employed to defend the use of potable gold, the treatise upon Natural History concludes. It represents to us the point in advance of his own age up to which Palissy had by this time attained in his researches into nature.

CHAPTER III.

FURTHER CONTENTS OF THE BOOK—THE GARDEN AND THE FORTRESS.

THE third of the four treatises included in the second work of Bernard Palissy displays his plan for a delectable garden. Still using his accustomed form of dialogue, he states that he should like to form a garden after his own heart, in some place where there are hills. He desires a hilly place, in order that he may be able to lead springs down from the high ground, to flow in a rivulet about his garden in the valley. There are in France, he says, more than four thousand noble houses, situated near spots convenient for his purpose; such spots being especially abundant along the course of the Loire, the Gironde, the Garonne, the Lot, the Tar, and almost all the other rivers.

"*Question.* Tell me, then, how you propose to ornament your garden, after you shall have bought the site?

"*Answer.* In the first place, I will mark the quadrature

of my garden of such length and breadth as may seem requisite, and I will make the said quadrature in some plain that is bounded by mountains, highlands, or rocks, on the sides of the north wind and the west wind, in order that the said mountains, highlands, and rocks, may serve me in the things of which I presently shall tell you. I will take care also to fix the situation of my garden below some spring of water issuing from the said rocks, and coming from a high place; and that done, I will make my said quadrature: but wherever it may be, I will build my garden in a spot where it may have a meadow below it, so that one may pass sometimes from the said garden into the meadow; and this for reasons which shall be hereafter adduced. And having thus made good the situation of the garden, I will proceed then to divide it into four equal parts. There shall be a great walk formed like a cross in the said garden, and at the four ends of the said cross there shall be at each end a cabinet, and in the centre of the garden and the cross there shall be an amphitheatre, such as I will presently describe. At the four corners of the said garden there shall be in each a cabinet, which are in number eight cabinets and an amphitheatre that will be erected in the garden; but you must understand that all the eight cabinets will be differently garnished, and of such contrivance as hath never yet been seen or talked of."

The stream of water is to be conducted in such manner about the garden that it shall pass through each of the eight cabinets, and being retained in each in various pro-

portions, escape from it again through more than a hundred little jets. Having explained this matter, Palissy proceeds to describe the plan of each of the proposed cabinets in detail. He begins with the cabinets at the four corners. That at the corner to the north adjoins the rock, and is to be built of bricks, crusted externally with unhewn rock, and so contrived that persons descending from above may walk upon its roof without knowing that they stand upon a building. On the roof are to be planted fruits, and such herbs as yield seeds grateful to song-birds, in order that they may be enticed to make that cabinet a place of their resort.

The water carried between the rockwork and the wall, is to issue again from the clefts between the rockwork as a natural spring. The cabinet inside is to be smooth, with windows looking southward, and seats built into the wall. Between each two seats there is to be a column on a pedestal, and having capitals above, with an architrave, frieze, and cornice running round the cabinet. Over the whole surface of the interior when it is built there are to be laid in artful device coloured enamels, and then a fire being made within the cabinet, the enamels are to be burnt; so that the whole interior of this cabinet will appear to be of one piece polished as a mirror, and beautifully coloured; around the frieze there is to run, in antique letters, the inscription—"God hath pleasure only in that man with whom Wisdom dwelleth."

The second cabinet, in the next corner on the northern

side, facing the south, is to be built also externally to resemble the rock against which it is placed, and fruits and herbs are to be planted over it, and water-springs to issue from it. It is to be built of bricks, but in the interior between the seats there are to be not columns, but grotesque figures fashioned out of brick, supporting architrave, and frieze, and cornice. And the grotesque figures are to be quaintly painted in enamel, and the whole interior of the cabinet is to be enamelled, and around the frieze there is to run, in antique letters, this inscription—"The fear of the Lord is the beginning of wisdom."

The third cabinet, on one of the southern corners adjacent to the meadow, is to resemble externally the other two, but its interior is to be formed of bricks disposed irregularly, as though it were a cavern rudely hewn out of the rock; and there are to be cavities which serve as seats, and a rude disposition of the surface is to suggest a frieze, carelessly hewn; the whole is to be covered with a white enamel, and afterwards lightly and delicately painted, and around the frieze there is to run, in antique letters, this inscription—"Wisdom will not make her dwelling in the sinful body, nor in the soul that is disposed to evil."

The fourth cabinet, in the south-western angle, adjoining the mountain on the west, covered with earth and plants, and resembling natural rock from which water flows, is in its interior to be still ruder than the last. The cavern is to present in its shape no idea of human

labour. It is to be tortuous, and to have such projections from its roof as that it shall appear in some parts ready to fall. Its windows, like the windows of the other three cabinets, are to be irregular in shape. Its interior is to be enamelled with veins of chalcedony and jasper, and strange ideas and figures growing and vanishing from floor to roof. And though there will be no frieze, yet over some part of the cavern there is to run this inscription—"Without wisdom it is not possible to please God."

Palissy next details his plan for the four cabinets which are to be at each end of the walks traversing the middle of the garden in its length and breadth. They are all to be formed of foliage, but under the branches which shade each there is to be a rock. "The first rock, then," says Palissy, "which will be in the cabinet on the north, shall be made of earth modelled, baked, and enamelled after the manner of a tortuous and rugged rock, of many strange colours, such as I am now making for the grotto of my lord the constable, not exactly according to the same design, because this work is not of the same intention.

"Note then, that at the base and foot of the rock there will be a natural trench or receptacle for water, which will be equal in length to the said rock. For this cause I will make projections on my rock, along the said trench, upon which projection I will place several frogs, tortoises, crabs, lobsters, and a great number of all kinds of shells, the better to imitate the rock. Also, there will be several branches of coral, whereof the roots will be at the foot

of the rock, in order that the said corals may have the appearance of having grown within the said trench.

"*Item*, a little higher on the said rock, there will be several clefts and concavities, on which there will be some serpents, aspics, and vipers, which will be couched and twisted on the said projections, and within the clefts: and all the rest of the height of the rock will be sloping, tortuous, and lumpy, having modelled over it a number of kinds of herbs and mosses that commonly grow about rocks and moist places. And above the said mosses and herbs there will be a great number of serpents, aspics, vipers, and lizards, which will appear to run over the said rock, some upwards, some to one side, some downwards, disposed in many pleasant gestures and agreeable contortions; and all the said animals shall be modelled and enamelled so like to nature, that the natural lizards and serpents shall come often to them with wonder, as you see that there is a dog in my workshop, that many other dogs have growled at seeing, thinking that it was natural. And from the said rock will distil a great number of jets of water, which shall fall into the trench which will be in the said cabinet, in which trench there will be a great number of natural fishes, and of frogs, and tortoises. And because upon the bank adjoining the said trench there will be fishes and frogs, modelled according to my art of earth, they who shall go to see the said cabinet will think that the said fishes, tortoises, and frogs are natural, and that they have come out of the said trench, inasmuch

as in the said trench there will be some that are living. Also, in the said rock will be formed some kind of recess, to hold the glasses and cups of those who may feast within the cabinet: and in the same way there will be formed in the said rock certain bins and little receptacles for the cooling of the wine during a repast, which receptacles will always contain cold water; because when they shall be full according to the prescribed measure of their size, the superfluity of the water will flow over into the trench, and so the water will always be fresh within the said receptacle. Also, in the said cabinet there will be a table, like in material to the rock, which also will be supported on a rock; and the said table will be of an oval fashion, being enamelled, enriched, and coloured with divers colours of enamel, which will shine like a mirror. And they who shall be seated to banquet at the said table will be able to put fresh water to their wine without quitting the said cabinet; for they will take it from the jets of the fountains of the said rock."

Palissy then proceeds, to the great dismay of his interlocutor, to relate the way in which he proposes to arrange the trees that are to form the chamber of this cabinet. It is to be an architectural plan altogether. Young elms, planted at even distances, are to be trained upward and lopped until their trunks have grown to a sufficient height to form the columns of a little temple. They are then to receive, above and below, circular wounds, which will cause the deposit of fresh wood and natural protu-

berances that shall correspond to the pedestals and capitals of ordinary columns. To the objection that the trunks of trees form clumsy columns, Palissy replies that columns imitate the trunks of trees, and that as a thing itself must always be superior to the imitation of it, so trunks of growing wood must be better architectural ornaments than pillars made of stone and mortar. The branches which shoot from the capitals of these living pillars are to be trained in the first instance, and elaborately worked into the pattern of an architrave, frieze, cornice, and all the accessories of a complete architectural design. The first young elm-branches having been thus fixed to grow into the exact pattern of a little temple, all the remaining shoots will be compelled to run together into a dense green roof, thoroughly impervious to rain. To ridicule, Palissy answered fairly, in his own time, that gardens abounded in dragons, cocks, and other absurdities, even soldiers on horseback, cut out of rosemary and other plants: if men admired such things, how much more thoroughly should they admire his living house, which, when established, would not need attention from the gardeners more frequently than about twice a year. Over the columns Palissy designs that there shall be formed first an architrave, and then a cornice. The frieze is to be left as a broad vacant space. Then, as the tree grows, some of the shoots which spring out of the architrave and cornice shall be chosen for training in the form of well-proportioned antique letters. "And," says Palissy, "in order that ingratitude may be contended against even by

insensible and vegetative things, there shall be in writing in the said frieze a text taken from the Book of Wisdom, where it is written: 'When the fools perish, then they shall call upon Wisdom, and she will mock when their fear cometh, because they would none of her counsel when she uttered her voice in the streets, when she cried in the chief places of concourse and in the openings of the gates, and uttered her words in the city.' That is what shall be written in the said frieze, in order that men who reject wisdom, discipline, and doctrine, may be condemned even by the testimony of souls vegetative and insensible." The three façades, then, will also supply three spaces upon which similar writings shall be placed.

There is a very wide difference between the cocks and men-at-arms carved out of shrubs, and Palissy's design for a green temple. I have not space for quoting the minute details of the plan, but enough has been described to show that here in gardening, as in all other things to which he turned his mind, Palissy had his own large thoughts, and that they corresponded to the boldness and the power of his genius.

The second green cabinet, which is to the east of the garden, is to be a little temple like the first, but the fountain within is to be walled with diaphanous white flints, forming prominences, and recesses which will serve as seats. The water of this fountain shall turn little wheels, and the revolving of the wheels shall cause the blowing of certain little bellows into flageolets placed in a brook at the foot of the rock, so that the flageolets being caused to sound

among the water, will emit gurgling notes that will imitate pretty closely the song of divers birds, and especially that of the nightingale. Upon the frieze of the cabinet over this fountain the device inscribed is to be "The children of wisdom are the church of the just," and in the pediment, on the three faces outside, there are to be written these several inscriptions: "Perverse thoughts part themselves from God"—"Fools despise wisdom and instruction"—"Happy is the man that findeth wisdom."

The third of the green cabinets, which will be under the western rock, is to be constructed like the others, in the form of a living temple, but the natural rock itself is to be used for the rock of the cabinet. Water-pipes, led through it, shall pour out what will appear to be natural fountains. Natural unpolished corals are to be attached here and there to its surface, and rare stones, such as chalcedony, jasper, porphyry, crystals, unpolished, are to be so neatly fitted here and there into its surface, that they shall appear to have been formed upon the spot by nature. In this cabinet there is to be a table formed of a rare stone, upon a pedestal of rock enchased with chalcedony and jasper. On the frieze of the cabinet the trees are to form this inscription: "The fruit of the righteous is a tree of life." And in the pediments of the three external faces shall be written three several inscriptions: "The way of life is above to the wise"—"The Lord giveth wisdom"—and "Wisdom giveth life to them that have it."

The last cabinet, which will be to the south, is to con-

tain a rock, hollowed and studded with rare stones from the sea-shore, both such as naturally would be found there, and others that have been among the ballast brought from foreign climes and discharged out of the holds of ships. With these stones are to be mixed figulines of lizards and serpents, with artificial turquoises; and within the cavern there shall be a spring, and on a rude frieze shall be inscribed in a mosaic formed with variously coloured stones: "Ho, every one that thirsteth, come ye to the waters, and ye that have no money." On the frieze of the living temple outside shall be written: "The fountain of wisdom is the word of God." And outside, on the three faces, the three inscriptions are to be: "The love of the Lord is wisdom"—"The fear of the Lord is the beginning of wisdom"—"The crown of wisdom is the fear of the Lord."*

Having thus detailed the plan of his eight cabinets or garden-houses, Palissy proceeds to describe the proposed arrangement of the rock or mountain-sides, which being situated to the north and west of the garden, have southern and eastern aspects, exposed greatly to the sun. The rocks are to be hollowed through their whole length into a series of chambers, serving sundry purposes: some to contain tender plants during the winter, with provision for the care of them; others to contain tools; others, seeds;

* Except that from Isaiah, these texts are all taken from Proverbs or Ecclesiastes, but it is not always possible to identify them in the English version.

others, a store of fruits or vegetables; others, for temporary dwellings to the gardeners, &c. Over these chambers there is to be hewn a terrace, reached by steps at either end, cut also from the rock.

The terrace is to be bordered by a balustrade, on which are to be damask roses, violets, and the most fragrant flowers, in enamelled pots; and on the other side, thickly overhung with hawthorns, and other shrubs and trees agreeable alike to men and birds, are to be the doors and windows, pleasantly designed, of an upper series of chambers in the rock. Of these upper chambers some are to be used for pleasure, others are to contain prunes, cherries, and such fruits as it is customary to dry in the sun, so that from them they may be brought out to dry on the unshaded portion of the terrace. The hawthorns and other trees which overhang these chambers are disposed to entice birds by their fruits, that they may make their dwelling in that pleasant, sunny place; in winter, seeds are to be thrown upon the terrace for their use, in order that this terrace may be known among the birds at all times as a good place of resort. The stranger who may walk upon this terrace, beside sweet scents, and sweet sounds of birds, and grateful shade, and the delightful prospect over the whole surface of the garden, is also to be pleasantly surprised, by now and then being induced politely to bow to some gentleman or lady, who leans over the balustrade and looks down pensively upon the

flowers, the said gentleman or lady proving afterwards to be nothing more than potter's clay — a rustic figuline. A few such figures Palissy proposed to place upon his terrace.

He proceeds next to describe the plan which he proposes for his central amphitheatre. The stream brought down from the mountains, having meandered through some part of the garden, is to be divided in the centre into two currents, which are to diverge and flow round an island exactly circular in form, then reuniting, to continue rippling in one current through the garden. About the margin of this island there are to be planted poplar trees at equal distances, the stems of which having been allowed to grow into erect columns of sufficient height to serve as pillars to the amphitheatre, are then to be inclined towards each other until they all meet at their points, and form a pyramid. At the summit of the pyramid there is to be fixed a vane, so made as to receive into its mouth whatever wind may blow from any quarter, and the wind so caught is to flow through a series of musical pipes, varying in magnitude, in such manner that there shall be at the summit of the central amphitheatre a kind of organ, with which the wind will always make Æolian music.

Within the amphitheatre—which is approached by little bridges—there is to be a round table, and there are to be easy seats, and places to contain vessels and vases for the service of the place. It is to be entered by four doors,

corresponding to the four broad walks which converge upon it. Outside, and at a distance of about five feet from the pyramid, there is to be a second circle, formed of young shrubs, which are to be connected together with brass wire; also from the summit of these shrubs to the summit of the columns, and between the columns, brass wires are to extend, enclosing everywhere spaces over head, which are to contain a large variety of birds, both song-birds and birds of gay plumage.

"And by such means," says Palissy, "they who shall banquet under the said pyramid will have the pleasure of the song of birds, of the croak of frogs which will be in the brook, of the murmuring of the water which will be flowing at the feet of the columns that will sustain the said pyramid, the freshness of the brook and of the trees that will surround it, the freshness of the soft wind that will be engendered by the movement of the leaves of the said poplars. There will also be the pleasure of the music that will be at the summit and points of the said pyramid, which music will play with the blowing of the wind, as I have already told you."

Around the frieze of this amphitheatre is to be another inscription from the book of Proverbs—"They that have hated wisdom shall eat of the fruit of their own way."

This amphitheatre completes the series of cabinets with which Palissy proposed to ornament his garden. He proceeds next to the consideration of some minor details. All trees and plants, for example, which it is proper to

defend from frost, are to be placed under the shelter of the mountains, which protect them from the north and the west winds; those being the two winds most hurtful to vegetation in Saintonge. In naming those two winds, Palissy expresses his appreciation of the fact that a wind may be hurtful in one region, and wholesome in another.

There are to be in the garden many little islands, planted with such flowers as delight in water. For the watering of the entire garden, or of any part of it, at will, Palissy suggests the use of a series of portable troughs, the bottoms of which are pierced with minute holes. The troughs, connected readily together, and raised upon props, are to carry the water from the fountains in a running stream, which may be checked and controlled in any portion of its course at the discretion of the gardener.

Those ingenious hydraulic engines, dear to the polite world two or three centuries ago, which suddenly discharged from some part of a garden-walk a jet of water on the unsuspecting stranger, Palissy declares that he will not admit into his paradise. He will have no spring-water guns. Instead of these dull jokes, he would place in his garden a few statues holding a vase of water in one hand, and an inscription in the other, so placed that when any one steps forward to examine the inscription, he may have the vase of water emptied on his head.

"*Item*," says Palissy, who is unable to resist the temptation offered even in this odd walk of art for the exercise of ingenuity—"*item*. I would make also other

statues, which should have a certain target or ring suspended from one hand, in order that when the pages ran with lance in rest against the said target, so soon as they should hit the ring, the statue would strike them a great blow on the head with a large sponge saturated with water, in such sort that the said sponge would discharge a large quantity of water, because of the compression and the greatness of the blow."

Bounding the garden on the south there are to be meadows with hawthorn hedges, through which the artificial brook is made to flow, planted with trees upon the margin; under the hedges of this meadow there is to be made a pleasant path. Bounding the garden on the east are to be fields planted with different fruits, one covered with filberts, one with chestnuts, one formed into an apple orchard, and, in short, there are to be spaces devoted to each kind of profitable fruit. Among the hills on the north will be grown hemp, flax, and plants, suitable for making ligatures required in tying up the shrubs and flowers of the garden. Bounding the garden on the west will be the woods and rocks already mentioned.

The cost of a garden which should realise this bold and elaborate idea would certainly be great. The usual expenditure, however, according to the taste of that time in the formation of a garden, with its elaborate architectural works, was so excessive, that Palissy declares himself able to construct his paradise at a cost less than that which

had been incurred for a thousand other gardens built by great men in his country.

Hereupon the disputant suggests to Palissy, that money might be better spent in buying offices and seeking promotion in the world, than in the creation for oneself of a place of recreation among fruits, and birds, and flowers. Upon this hint, Bernard expostulates briefly against the avaricious ways of men, who have "greater reverence for their own bellies than for the divine majesty of God." He says, "I found nothing better than to fly the neighbourhood and the acquaintance of such people, and to withdraw myself to labour on the earth, which is a just thing before God, and a great recreation to those who will contemplate admiringly the wondrous works of Nature." His garden had been first suggested upon hearing the 104th Psalm sung in the fields by pious maidens, in the days when the Reformed religion flourished in Saintonge. He relates how, contemplating the sense of the said Psalm, he was seized with so great an affection for the building of his garden, that "since that time," he tells us, "I have done nothing but toil over again within myself the building of the same; and often, in sleeping, I have seemed to be about it, as it happened to me last week, that when I was asleep upon my bed, my garden seemed to be already made, and in the same form that I described to you, and I already began to eat its fruits and recreate myself therein; and it seemed to me that walking, in the morning, through the said garden, I came to consider the

marvellous deeds which the Sovereign has commanded Nature to perform." The pious naturalist then proceeds, under the figure of a dream, to walk about the garden of his fancy, and to call attention to the wisdom displayed in the works of creation. The accurate adoption of means to divers ends, he points out, in particular instances, with an acuteness that displays how thoroughly he had been gifted with the naturalist's faculty of observation, and how philosophic was the disposition of his mind.

From this topic he passes naturally to a consideration of the havoc done among the woods and fields by the avarice of benefice-holders, or the ignorance of farmers. The censure of the agricultural tools, "clumsy at their first invention, which are preserved ever in their clumsiness," leads to the question, Which tools would be requisite for the construction of the before-mentioned garden? Palissy having named them, feigns with a lively wit another dream, in which his tools were to be heard quarrelling for precedence, and being at last rebuked by the Astrolabe, who told them that they were all subject to the head of man, they spoke so contemptuously about man, "who has not a straight line in him," that Bernard, still in dream, desired for himself to subject a man's head to measurement. He then enters upon a series of humorous researches into human heads and bodies, by means of his tools and retorts, flasks and sand-baths, which "separate all the terrestrial parts from the exhalative matter." He examines priests, fops, lawyers, tradesmen, and fine ladies,

and relates the result in such a manner as to give a lively picture of the sins and follies prevalent in his own time. This leads him to speak of the great troubles he has seen occasioned by the "follies and rogueries of men." He tells how he had "thought within himself to make the design of some town or city of refuge in which to retire in time of wars and troubles, and evade the malice of many horrible and insensate plunderers, whom I have before now seen in the execution of their furious rage against a great multitude of families, without having regard to just or unjust cause, and even without any commission or commandment." "I pray to God," he says, "to give us His peace; but if you had seen the horrible excesses of men that I have seen during these troubles, you have not a hair in your head that would not have trembled at the fear of falling to the mercy of man's malice. And he who has not seen these things, could never think how great and horrible a persecution is."

Being then asked to tell how persecution arose in his own district, Palissy proceeds to relate the History of the Troubles of Saintonge, because it would be well that in each town there should be persons deputed to write faithfully the deeds there done, in order that by the abundance of such local records there might be provided fit materials for the study of the general historian.*

* Under the titles of *The Naturalist looking out on Evil Days*, and *A History of the Troubles in Saintonge*, the whole of the text of Palissy which follows the account of the delectable garden will be found trans-

From the consideration of these troubles Bernard naturally comes to the description of that impregnable fortress which he proposes as a city of refuge, "wherein one might be secure in time of war." He tells us how, when he had proposed to himself the difficult problem, "considering the furious batteries of which men now make use, I was almost out of hope, and went every day with my head bowed, fearing lest I should look at something which would cause me to forget the things of which I desired to think."

He first considered the existing towns, in order to ascertain whether some one of them might not assist him in obtaining an idea, but he found they could in no case serve him for a copy, "seeing that when the walls are overcome, the town is forced to a surrender. Truly," he says, "that is but a poor body of a town where the members cannot consolidate and aid each other." Then, finding that the figures of Jacques de Cerseau, and the plans of Vitruvius and Sebastian—of whose works there existed a translation—did not aid him, Palissy "walked like a man absent in mind, the head bowed, without saluting or regarding anybody, because of the interest which was engaged on behalf of the said town."

In discussing his garden, and in other places, Palissy occasionally shows that he has paid attention to details of

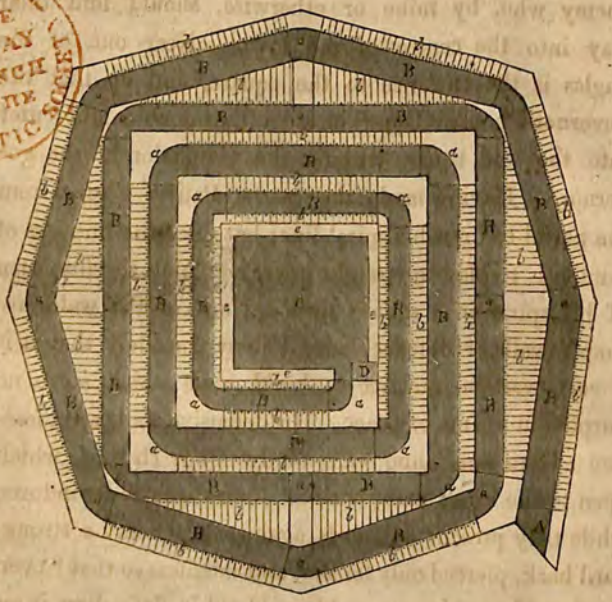
lated in the Appendix. Of the garden itself the design has been sufficiently detailed in the preceding abstract.

architecture, and that he has been studying Vitruvius. It is extremely probable that he was influenced in this respect by Jean Bullant, the architect of Ecouen, and his fellow-labourer at the château in executing ornamental works. Bullant was an enthusiastic student of Vitruvius, and must have been on familiar terms of intellectual acquaintanceship with Bernard Palissy. We shall see presently that they were fellow-labourers not at Ecouen only.

Palissy, getting no aid from the architects, examined also artfully constructed gardens, and endeavoured to gather some hint from the complex patterns of the flower-beds; failing in this also, he began to wander through the woods, mountains, and valleys, to examine the fortresses constructed by the animals whom God had taught how to provide for their defence. There follows then another narrative, in which the naturalist displays his exquisite appreciation of the marvels of creation. "I found things," he says, "which made me all abashed, because of the marvellous Divine Providence which had bestowed such care upon these creatures." Encouraged and delighted by this study of creation from a special point of view, Palissy tells us how, "joyous enough, I walked hither and thither, to one side and to another, to see whether I could further obtain some lesson from the buildings of animals; which lasted for the space of several months, during which time I always exercised my art as potter, to support my family."

Finding at length that it was "on the shore and the rocks of the ocean" that he was most likely to find suggestions suited to his own particular design, Palissy confined his studies to the sea. The delightful narrative of these researches into nature will be found in a selection from the works of Palissy at the close of the biography, together with the account given by Bernard himself of the city of refuge which he finally proposed to build. It will suffice here to describe the fortress briefly.

A citizen of Rochelle, named l'Hermite, had given to Palissy two large shells that had been brought from Guinea—a purple murex, one of those spinous, pink-lipped shells which we occasionally see on English mantelpieces, and a conch, one of the massive shells which we see now and then in England on balconies, or under empty grates. Palissy having observed "that God had bestowed more industry upon weak things than upon strong," selected therefore the weaker of the two shells; and "I could find," he says, "nothing better for the building of my fortified town than to take example from the fortress of the said purple murex, and took straightway a compass, rule, and other tools necessary for the making of my picture."



The picture was not given to the world by Palissy, except in a description with which the preceding woodcut has been made to correspond. The spiral form is copied from the shell. Palissy commences by drawing an open square (C), surrounded by a high wall corresponding to the backs of houses that have all their windows opening upon an outer street. Within this wall, and surrounding the square, are galleries (e e e) for holding artillery under cover. The lesser walls before the galleries are pierced with portholes, and the cannons pointing over the whole surface of the square are ready to open fire on any

enemy who, by mine or otherwise, should find their way into the centre of the town. Near one of the angles is the entrance to the square, and by that the governor's house (D); "in order that none might enter into the said square without the permission of the governor." Having made the square, Palissy begins from the portal to draw his spiral line; but since the business of cannon is to play in straight lines, he makes the first turn of his spiral in a square form. None of the walls are simply walls of defence, since Palissy considers that it is a very wasteful practice to build walls which serve no purpose in a time of peace. His defensive walls are therefore at the same time walls of dwellings (b b b), which open to the inner street with all their doors and windows, while they present outwards against the enemy a strong, hard back, pierced only for shot and missiles; so that "even children above six years old could aid in defending it on the day of assault, and that, too, without displacing any one of them from his own home and dwelling." At each angle of the spiral is a battery (a a a), under which the townspeople pass by a vaulted way that can be secured at either side with heavy gates. The guns from the battery at each end of each street, all the streets (B B B) being made straight for that especial purpose, are ready to play on any enemy enclosed between them, and each street, with its gates shut, becomes an enclosed fortress in itself. Palissy, having drawn in the same form the next turn of the spiral line, finds, when he comes to draw the third, that if he were to continue with the extended square, each street

would be too long to be commanded wholly by the batteries; his square, therefore, is converted into an octagon. The same arrangement is continued, which provides that each turn of the spiral shows a strong wall outwards to the enemy, and doors, windows, and traffic inwards to the people of the town. From this arrangement it follows that, in walking inwards from the outer gate (A), each street will be found to have traffic on the right hand, and fortress-wall upon the left; only the streets immediately outside the walls of the central square having shops, windows, and doors on each side of the way. The traveller will have to wind his way also round all turns of the spiral, and under all the batteries, if he should desire to visit a house near the entrance to the central square. Having made two turns in the octagon form, Palissy considered that his town was made sufficiently extensive. Accordingly he finished with a battery over the outer gates.

By the means of assault that existed in his own time, such a fortress as that planned by Palissy would be, of course, impregnable. It is quite true that the resistance of any one street to a governor who plotted a surrender, causing the gates of that street to be closed, would prevent either the enemy from passing in or the traitorous governor from passing out. It is quite true that a small garrison, and that of people following in ordinary life their peaceful trades, would be sufficient to defend this town. It is quite true that if the entire circuit of its outer walls were demolished by besiegers, the inhabitants of the town, having retreated to the next street, would

have lost no more than the few feet of ground, and be as well protected by their walls as though the siege were then for the first time commencing. A breach or mine would secure entrance into nothing but a single and straight street, commanded by two batteries able to sweep down all who might enter. "And what is more," says Palissy, with perfect truth, "if the enemies had been still more determined, and had broken a way quite through the middle of the said town, and that they could pass and repass through the said town to the number of forty abreast, drawing with them all kinds of engines and artillery, yet so it is that they would not yet have gained that town."

The resources of artillery could in the time of Palissy produce nothing that would have been able to subdue a town constructed upon this ingenious plan. Modern history suggests to us instantly the use that has been made of barricades, but Palissy appears not to have taken as an element into his calculations the possibilities of a revolt against authority. If the population of his city of refuge were to fall out upon the topics which in those days divided France, and Catholics should fortify themselves in one street, Huguenots in another, the peaceful streets lying within any blockade would be converted into prisons. As a curiosity, a specimen of ingenuity, this idea for a fortress is extremely interesting. It shows another of the many subjects on which Palissy employed his busy wit, and shows again how thoroughly the love of nature

governed all his other thoughts. From the woods and fields he brought his counsel to the farmers. Among the rocks he learnt the secret of the water-springs, and learnt a wiser doctrine than that fossils were earth-crystals, moulded by a plastic influence, descending from the stars. Lizards, leaves, flowers—patterns upon which God had lavished beauty—were the chosen models for his elegant designs in clay. A delectable garden was his ideal of earthly bliss, and even when he wished to plan a fortress that should withstand the utmost fury of a siege, he visited the nests of birds, and wandered on the rocks by the sea-shore, and finally adopted the design that was suggested to him by the contemplation of a shell.

CHAPTER IV.

PALISSY REMOVES FROM SAINTES.

THE book described in the preceding chapters was issued in the years 1563 and 1564. On the cover of the copies issued in the year 1564, the author is described as Bernard Palissy, of the Tuileries. Palissy continued, therefore, to reside at Saintes only for a very short time after the publication of his Trustworthy Receipt, and then, under circumstances which we shall presently examine, he removed to Paris.

Hitherto it has been found necessary to include among the chapters of this narrative a brief sketch of the origin of civil war between the Catholics and Huguenots. We could not understand the character of Palissy, or his position in the town of Saintes,—we could not feel the significance of the denunciations, or the true sense of the social narratives in the Trustworthy Receipt,—and we could not enter into the spirit of the relations between Palissy and the Constable Montmorenci, or his other patrons, without

recalling to our minds, as we went on, the progress of political events. Our narrative of the affairs of France need, however, be continued only over one or two more years. It closed with his imprisonment, and it must be resumed in order that we may understand how matters stood at the time when his book issued from the press, and what was the position of affairs in 1564, when Bernard went to Paris. Settled in Paris, Palissy devoted himself wholly to his labours as a potter and a naturalist. He took no part in the contention that distracted France, beyond the exercise of a freedom of speech, that seems to have been humoured as eccentricity in the simple-minded man. The contentions did, indeed, not leave him to repose; he did not, it will be seen, escape his due share of affliction; but his character was formed, his final course of life was taken. We must now dwell for a few minutes on the current of affairs in France between the date of the imprisonment of Palissy and that of his arrival in the capital; from that time forward it will not be requisite for us to pay more than occasional and slight attention to political events.

At the end of September, in the year 1562, Rouen, besieged by the Catholics, was taken. The day before the town was taken, Antony, King of Navarre, having retired to the trenches on a summons which the mightiest have to obey, received the shot of a harquebus in his left shoulder. He was carried away to confession and sacrament; caused the book of Job to be read to him for his comfort; publicly declared that if he recovered he would

adopt the Reformed opinions; and turned his back upon a Jacobin before he died. His wife, Jeanne d'Albret, had left him to act with the Catholics in Paris, while she had herself retired to maintain Reformed opinions, and educate in them her son Henry, who became afterwards King Henry IV. So Antony, King of Navarre, was gathered to his fathers, and bequeathed to other Navarres his royal state and income of about six thousand a year.

There is another incident connected with the siege of Rouen, told by two or three contemporary writers, which furnishes an odd illustration of the chances and changes to which mortal life was subject in those days, when murder was every man's right-hand neighbour. There was a certain young Norman, Captain Sevile, shot in the head, and tumbled from the rampart as a bird is picked off from a bough. At the foot of the rampart he was taken up for dead, and buried about mid-day with many corpses. His valet, coming in the evening with a horse to his master, and learning that he was both dead and buried, pressed to be shown the place of burial, that he might take away his master's body, and embalm it for the comfort of his parents. Having disinterred fifteen or sixteen men, with faces so much bruised and bloodstained that he could not recognise one as his master, he, with the aid of some companions, put the bodies hastily again into the ground. After their return to the camp, the faithful servant felt that they had been irreverent towards the dead, in restoring them so hastily to their graves; that dogs might commit an easy

burglary upon the last home of his master, if his master had been one of the men disinterred and hurried back into the ground again so carelessly. He persuaded, therefore, some of his companions to return with him after sunset, when the moon was up. Arrived at the ground, the valet saw the hand of a half-buried man protruding from the soil, and on its finger a diamond ring glittered in the moonlight. The ring attracted his attention, and he recognised it as belonging to his master. Captain Savile was then dug up, placed on a horse, and taken to his brother's lodging, where he was left until the third day, stretched on a mattress, because his friends perceived that he breathed, and that there was heat remaining in his body. Many surgeons were brought to the room, but when they saw the patient, carried away their drugs to the crowd of expectant sufferers for whom there was more hope. On the third day there were brought a physician and an advocate, who, forcing open the captain's teeth, poured into his mouth a drug with wine. While they were labouring to restore life in this way, the town was taken, the house entered by the enemy, the brother slaughtered, and the body of the captain roughly taken from the bed, and thrown out of the window. It fell upon a dunghill, and lay there neglected for three days, becoming covered with the filth and straw that were thrown out of the windows of the same dwelling. At last a cousin found the captain's body, and carried it out through the breaches to a village, in which it was resusci-

tated, and the captain's wounds were dressed, and his health perfectly restored. "I have seen him," D'Aubigné tells us, "forty-two years afterwards, acting as deputy from Normandy in the National Assemblies, and observed that when we signed our transactions, he always put 'François Sevile, three times dead, three times buried, and three times by the grace of God restored.' Some ministers (contrary to my advice) desired to make him desist from this eccentricity, but they were unable to entreat him out of it." There is a flavour of romance and a suspicious dwelling on the number three in Savile's tale; of course, also, a breathing man, fairly put under ground for a few hours without a coffin, however slow might be the processes of life, would have his breath stopped most effectually. His exaggerated story was, however, credited in his own day, and certainly was suited to the day in which it was believed.

After the taking of Rouen, the Prince of Condé, being reinforced, marched out of Orleans upon Paris. There he was delayed by Catherine before the faubourgs of St. Germain, St. Jacques, and St. Marceau, and lost time over a vain endeavour to adjust peacefully the matters in dispute. Paris being strengthened, Condé, on the 10th of December, 1562, broke up his camp, and hastened towards Normandy to meet some English succours. Of the English troops aiding the Calvinists, and of the German troops aiding the Catholics, I shall not speak. We may remember, however, concerning the German troops, that

when bands of them were dismissed with a safe passport, after the first war, Catherine gave secret orders (wisely disobeyed) that in spite of their passport, they should be fallen upon and destroyed in their passage out of France, in order that none of their brethren might thereafter feel inclined to take part in and aggravate the tumults of the country.

The Prince of Condé, hurrying to Normandy, was pursued by the army of the Royalists, and overtaken at Dreux. A terrible battle was there fought on the 19th of December. The constable was taken prisoner, and one of his sons was killed. The Marshal St. André, one of the triumvirate, was destroyed by the pistol-ball of a personal enemy. The Prince of Condé, on the other side, was taken prisoner. The battle was won with difficulty by the Duke of Guise, who remained deprived of his two chief competitors at court—of St. André by his death, and of the constable by his imprisonment. The two prisoners, the Prince of Condé and the constable, were on each side treated with affectionate respect, great pains being taken to influence their minds, and disabuse them of the errors into which it was supposed that they had fallen.

The Duke of Guise, left sole head of the Royalists, went to besiege the head-quarters of the Huguenots in Orleans, while Admiral Coligny, sole general of the Reformers, was in Normandy awaiting English money, and preparing to bring help to D'Andelot his brother, by whom Orleans was defended. The Duke of Guise, having ridden

out before Orleans to review the preparations on the river for a grand assault, by which he hoped that Orleans might be taken, was shot down at twenty paces by an assassin of good birth, Jean Poltrot de Meré. The duke was taken home and died in six days ; it was said that the bullet had been poisoned. The assassin, under question and torture, accused Coligny and Beza as the instigators of the crime. Both denied the accusation ; Coligny said that he had paid money to Poltrot for service as a spy, but never hired him for the work of an assassin. The Duke of Guise then died a death of violence, as Antony of Navarre had died, as Marshal St. André had died, and as most of the great friends and rivals who survived him were to die, each in his own turn. The duke died counselling peace, and there succeeded a son, hot in passion, who regarded Coligny as the assassin of his father, and after some years, paid his debt of vengeance on the Day of St. Bartholomew.

The death of the Duke of Guise produced a lull in the hostilities, while the queen laboured to carry out his dying counsel. Coligny held out against all concession, but he being in Normandy, the captive Prince of Condé was persuaded to consent to terms which saved Orleans, as he believed, and secured tolerable terms for the Reformers, at the same time that it closed the war. The treaty was signed at Amboise, on the 19th of March, 1563. It left the Reformers at liberty to worship as openly as they pleased, in all towns held by them at the date of the

pacification. Elsewhere, they were subjected to numerous restrictions. Coligny, together with a large body of the Reformers, protested loudly against the conduct of the Prince of Condé in signing the conditions of Amboise at a time when, the Duke of Guise being dead, victory was certain. Coligny had an army gathered with much care in Normandy, which would have sufficed to compel the Catholics into concession of a full religious liberty. The treaty was signed, however, and the army of Coligny dispersed. The constable and the Prince of Condé quitted their captivity, and there was peace.

There was, indeed, need of rest for France. From commerce and agriculture, men had been called to arms; fields were untilled, or ravaged; the finances of the country and the bread of the people were almost destroyed. The poor were compelled to plunder. Hordes of brigands overspread the country, rivalled in ferocity by the acknowledged military leaders, among whom there was none more cruel than Blaise de Montluc. There was need of rest; but there were no minds calmed, there was no party subdued, there was no party satisfied. It was, therefore, to be foreseen by all thoughtful men, that there would be a renewal of the war when, on all sides, a little breath had been recovered. Palissy spoke of this when he was about to relate his plan for a city of refuge; and if we do not think that the allusion was interpolated by Palissy before committing his work to the press (it was published a few months afterwards), we must conclude

that this last part of his book at least was written after his imprisonment. "It seems to me, when I hear you talk," his querist is made to say, "that you do not feel assured of the peace which it has pleased God to send us, and that you have still some fear of a popular outbreak." "I pray to God," is the answer, "that it will please Him to give us His peace." It was in the beginning of the peace between the first and second civil war that Palissy's Trustworthy Receipt was published.

One of the first acts of the peace was to besiege Havre and drive out the English, to whom the town had been ceded by Condé, in pledge for the repayment of money advanced. Condé, in Paris, lived at ease. Cardinal Lorraine had been distinguishing himself at the council of Trent, which closed in December of the same year, 1563. Coligny, accused by the Guises of the duke's death, came to answer for himself at Paris, surrounded by a guard of five or six hundred gentlemen, which he considered necessary to his safety. Catherine, upon that hint, surrounded the king with a guard of six hundred Swiss and five hundred Frenchmen, in addition to the hundred Swiss formed into a royal guard by Louis XI. The Constable Montmorenci supported the cause of his nephew Coligny, regarding it as a private matter which concerned the honour of his house. His opposition to the Reformed Church party continued undiminished.

Peace was made with England, and his Majesty of France, thirteen years old, was declared of age at Rouen.

Charles IX., with the queen-mother, her maids of honour, and a gay retinue, accompanied by no more soldiers than civility required, then set forward on a festival journey through the south of France. They travelled, through applause and fireworks, to Bayonne, where the young king was to meet his sister Elizabeth, the Queen of Spain;—who had been plighted to the king's son, Don Carlos, and married, very much against her will, to the grey-headed father of her betrothed. The court set out upon this trip in the year 1564, and returned in 1565, after having visited many of the southern provinces. It may be that Catherine during this tour was visited by Palissy at some point in the royal progress not too distant from Saintes, and that she then engaged his services upon her proposed palace of the Tuileries. It may be that Palissy was indebted for his removal to Paris to the success of his labours at the Château of Ecouen. The architect of the château, Jean Bullant, was selected to assist in building the new palace of the queen-mother, and with Bullant as architect, it may have appeared natural to summon Palissy as decorator of the gardens. Upon this point we can only speculate; but we know with certainty that very soon after the publication of his Trustworthy Receipt, Bernard Palissy of Saintes became Bernard Palissy of the Tuileries, his workshop being then, as he tells us in a later book, within the precincts of the Tuileries, and near the Seine.

The object of the queen-mother in founding what is now called the Palace of the Tuileries was very natural.

As the king grew in years, it became less advisable that he should reside like a child under the same roof with his mother; Catherine proposed, therefore, to quit the Louvre, and establish a habitation of her own. She by no means intended to retire from active interference in the State affairs, and resolving not to travel far, laid the foundations of her new home on a piece of ground, close to the trenches of the Louvre, called the Tuileries. This ground, which had been occupied by tuileries—by tile-kilns—had been bought in 1518 by Francis I., and given by him to his mother, Marie-Louise of Savoy. Catherine added to this ground, in 1564, a purchase of the site of some adjacent buildings, and in the same year caused the digging of the foundations of her new palace to be commenced, under the two architects, Jean Bullant and Philibert Delorme. The intended palace was named, from its site, on what had been the potters' field, placed out of town for prudence and convenience, the Palace of the Tuileries. In the same way one of the finest quarters of old Athens was called the Ceramic, because it covered ground once held by extra-mural potteries. From the precincts of the Palace of the Tuileries the traces of the brick and tile makers had not been erased even in the time of Louis XIV. On manuscript plans that belong to the beginning of that reign, the place occupied by wood-stacks and kilns are to be found marked in the courts of the château.

Among the tile-makers, therefore, whose wood fires

were not yet extinguished,—among the gardens that partly occupied the site of the new palace,—among the pulling down of buildings, and the turning up of earth for the foundations of the queen-mother's new palace, Palissy established his workshop. From that time forward he was able to live in constant intercourse with men of genius and the best works of art collected in the capital. The position of Bernard's works at Saintes must, indeed, before that time, have proved inconvenient. His chief patrons were the great men of the court, from whom in a remote province it was not easy to receive frequent visits; and although their houses might be scattered throughout France, it would in most cases be easier to visit them, or to transmit completed works to them, from Paris than from Saintes.

Palissy removed, therefore, to Paris, and established his workshop in the precincts of the Tuileries. His work on behalf of the queen-mother formed only a small part of his daily occupation. His taste being aided by a study of the best works of Italian art, he was now able to surpass his former efforts in the creation of elegant and rich designs. Very few traces of the large figulines of Palissy —his rocks, trees, dogs, or life-like human figures—now remain; but he found much employment in his own time upon such works for garden architecture. The park at Chaulnes, in which Gresset composed his "Chartreuse," was executed according to a plan resembling that of the delectable garden. The Château of Nesle in Picardy,

that of Reux in Normandy, and perhaps the royal château called Madrid, after the Spanish captivity of King Francis, in the Wood of Boulogne, are some of the places upon which it is remembered that Bernard Palissy was once employed.

Those works of the famous Potter which were meant to adorn rooms, being smaller, more numerous, and better protected than his garden-pieces, have been much more successful in withstanding all the accidents of time. Statuettes, elegant groups, vases, cups, plates, corbels, rustic basins, and clay moulded into beautiful forms, enamelled and painted for many other uses, still remain, and obtain a high price as works of taste in our own day.* Some are covered with modellings, exquisitely coloured, of fruit, shells, fishes, and reptiles. Others present coloured pic-

* M. P. A. Cap, the editor of the 8vo. edition of the works of Palissy, published in 1844, named M. Ch. Sauvageot as then the possessor of the most complete series of the works of Palissy, in a collection of the best artistic productions of the sixteenth century. Mr. Marryat, in his "History of Pottery and Porcelain" (1850), says that "the most extensive and complete collection of Palissy's fayence exists in the 'Musée Royale,' in the Louvre, and in the Hôtel de Cluny, purchased since the death of M. du Sommerard, its late proprietor. These magnificent specimens were eagerly bought up by the French government, from a just appreciation of the merits of their talented and much-persecuted countryman." At a sale at Phillips's, of Palissy-ware belonging to M. Roussel, of Paris, Mr. Marryat informs us that a very large vase, "enriched with boys in relief, supporting flowers and fruit in festoons, with mask heads, on a fine blue ground, and snake handles, sold for 57*l.* 15s.; a very curious candlestick, with perforated work and heads in relief, sold for 20*l.*; and various figures and other small objects brought high prices."

tures, in the most delicate bas-relief, of subjects taken from mythology or Holy Writ. The colours used by Palissy were commonly bright tints of yellow, blue, or grey; he used also, but less frequently, green, violet, and brown. His enamel is hard, but he seems never to have succeeded in making it so purely white as the enamel of Luca della Robbia.

During the ten years following his settlement in Paris, Palissy, familiarly called Bernard of the Tuileries, laboured with his sons as a potter, at the same time that he exercised his genius as a naturalist among the men of taste and learning in the capital, and continued actively the prosecution of his studies among the hills and fields. His philosophy grew yearly deeper and wider, and the knowledge displayed in his publication of the Trustworthy Receipt was left behind, as he thought his own way forward to maturer views.

This narrative should not omit to chronicle the death of the great patron of Palissy, the Constable Montmorenci. There were two more bursts of civil war, and two more peaces between that of which we have already spoken and the Massacre of St. Bartholomew. During these wars Bernard continued quietly at work, and no man interrupted him. At the beginning of the second war, however, he lost his friend, the constable, who was brought with six wounds into Paris, from the battle of St. Denis, in which, though he was then seventy-four years old, he had been fighting stoutly. He died on the next day, and

received from the queen funeral obsequies similar to those lavished upon princes of the blood. She paid the money joyfully, the Sieur d'Aubigné hints, counting the death of her controller as one of the blessings of her life, and an assurance of success in her designs. The mourning was most thorough in the hearts of old state counsellors, who, deprived of the protecting shadow of the constable, no longer were assured that they might safely give free expression to their sentiments.

In the year 1569, the Prince of Condé perished in the battle of Jarnac. By an accidental kick from the horse of La Rochefoucault, his leg was splintered so that the bone appeared through his boot; but paying no heed to the injury, he led his troop into the battle, had his horse killed under him, and finally was slaughtered with a pistol-bullet from behind. He was but thirty-nine years old, and perished as Antony of Navarre had perished, and as each member of the old triumvirate, the Duke of Guise, Saint André and the constable, had perished, by a death of violence, unhappily well suited to the temper of the times.

Palissy, in the mean time, laboured in the precincts of the Tuileries. The building of the palace had proceeded steadily, under the care of Delorme and Bullant, and it rose at no great distance from the Louvre, which was then itself a new structure, the design of Pierre Lescot. Lescot, of equal age with Palissy, was the leading architect of his

own day; Delorme and Bullant yielding very little precedence to him in reputation.

There is a MS. in the Royal Library at Paris, entitled, "Expenses of the Queen Catherine of Medicis," in which, among expenditure for the year 1570, there occurs note of a payment "To Bernard, Nicolas, and Mathurin Palissys, sculptors in earth, of the sum of two thousand six hundred livres, for all the works in earth, baked and enamelled, which remained to be done for the completion of the (four bridges ?—the writing in MS. is indistinct at this part, but appears to be 'quatre pons') which lead to within the grotto commenced for the queen, in her palace near the Louvre at Paris, according to the agreement made with them."

The grotto here named is perhaps one of those works placed in a circular island, and approached by bridges, in the way described by Bernard in his account of the delectable garden. We find him, at any rate, upon the testimony of the manuscript, to have been busily carrying into effect one of his ingenious garden plans within the Tuileries, in the year 1570. In the year 1572 Catherine abandoned the Tuileries. Disgusted with her palace, by chimerical predictions, she bought for herself another home in the Hôtel de Soissons. The Palace of the Tuileries continued to increase from time to time in after years, under succeeding princes, but there remains to our own day little or no trace of the work of its first architects,

Delorme and Bullant. Their edifice was planned upon a scale much larger than the present building.

The year 1562, in which Catherine quitted the Louvre (she was then fifty-three years old), is the date of the Massacre of St. Bartholomew. Palissy survived it, though he made no secret of his faith; his quiet life and his employment in the royal service doubtless sheltered him. He had said of the outrages committed in Saintonge, "If you had seen the horrible excesses of men that I have seen during these troubles, you have not a hair in your head that would not have trembled at the fear of falling to the mercy of men's malice. And he who has not seen these things could never think how great and horrible a persecution is." The cry of "Bleed them, bleed them, for the doctors say a bleeding is as good in August as in May!" the boast of the mechanic, who displayed his arm clotted with blood to the shoulder, and proclaimed that he had thrust a sword with that arm through four hundred living bodies, had no parallel in Saintes. It is happily not necessary for this narrative to dwell upon the familiar story of the massacre. Palissy escaped. About two years afterwards, in May of the year 1574, Charles IX. died at the age of twenty-five. He was the fourth king whom death had taken from the throne of France during the vigorous life of Palissy. On the accession of the new king, Henry III., the poor Potter, Master Bernard of the Tuileries, was sixty-five years old. He was regarded by all men as a very honest man, vindictively watched by

some men as a Huguenot, admired for his clear-sighted philosophy by some of the first scientific men in Paris, but by the rest despised as a mechanic ignorant of Greek and Latin, who did well modestly to call himself "Worker in Earth." He was well known in Paris, and a man to patronise, to talk about as "the poor Potter, M. Bernard."* But he had no fame in his own day except among the luxurious who bought the produce of his labour in the workshop, or the few men who had enough in them of true philosophy to know the value of his labour in the fields.

* Que direz-vous du pauvre Potier, M. Bernard, a qui le même roi parla un jour, &c.—*Confession de Sancy.*

CHAPTER V.

PALISSY IN PARIS.

CONCURRENT with Bernard's other occupations, was that labour in the art of pottery which he at no time omitted to pursue, during all free years of his life, between the date of his discovery of white enamel and the date of his decease. It may be convenient to state here, that after his death, the labour of his workshop seems to have been continued by his sons, who, possessing designs, moulds, and unfinished pieces left to them by their father, used them in the prosecution of their business. In this way, it is easy to account for the existence of a plate in which the borders form a pure specimen of Palissy-ware, while the painting in the centre represents Henry IV. and his family. The sons of Palissy, wanting their father's genius, feebly sustained the reputation of his ware; they could produce nothing comparable to their father's exquisite designs. Whether they died, and took out of the world with them the

mechanical secrets of their father's art, or whether the wits of Palissy found bread for yet another generation of descendants, it is now impossible to tell. The secret of Palissy soon perished, and of the feeble efforts of his sons the history of art retains no record.

It will not be necessary to recur to the subject of Bernard's labour as a potter. We have only to bear in mind, during the remainder of this narrative, the fact, that Palissy, while he became prominent, during his last years, as a man of science, was also labouring industriously in his workshop. We may now, therefore, close this portion of our subject, and append to it, by way of signature, the Potter's mark, as it was graved, with a sharp point, by Bernard, on the produce of his hands.*

It has been seen already that Palissy was, for a long time, known by those who had any acquaintance with him, as a collector of natural curiosities. He speaks, incidentally, in his "Trustworthy Receipt," of the citizen of Rochelle, named l'Hermite, who made him a present of two foreign shells; of Pierre Guoy, citizen of Saintes,

* The mark is copied from that given in Mr. Marryat's work on Pottery. Mr. Marryat extracted it from the *Description du Musée Céramique de Sèvres*, by MM. Brongniart and Riocreux.

who found upon his farm a remarkable stone, and because he knew that Palissy was curious in such things, made a present of it to the Potter. We are told, in the same way, of the Abbot of Turpenay, of La Mothe Fénélon, secretary to the King of Navarre—a wily and ambitious man, the same who was afterwards sent over to justify, to the court of England, the Massacre of St. Bartholomew — as lovers of letters, who had made presents of natural curiosities to Bernard, "knowing," as the Potter says, "in very good truth, that I was curious about such things." Palissy had, in fact, been forming, and possessed, in the year 1575, a cabinet of natural history, calculated to illustrate, very fully, the philosophic views of nature which he had, by that time, matured. In the year 1575, the age of Palissy then being sixty-six, the Potter had developed, fully, all those views of nature which we shall have presently to detail, and which make good his title to a very high rank among the philosophers of the sixteenth century. Before putting the final results of his researches into his last and most important book, he wished to make proof of their soundness, and to subject his reasonings to the severest test.

Modestly sensible of his ignorance of those languages in which was contained the learning of past time, believing, nevertheless, that he had pushed on his knowledge, as a naturalist, many steps into the future, he desired to know whether he might not, on some points, have deceived himself. It was quite possible that many things,

which he had thought out for himself, had for a long time been familiar to the scholars; it was quite possible, too, that positions which, to his mind, appeared incontrovertible, when exposed to the keen criticism of learned men, might easily be controverted or destroyed. Such things were possible, though Palissy was not wanting in a strong conviction, on his own part, that his views were true. If false, they could not be too speedily demolished. Palissy, a true philosopher, saw in free discussion, strict inquiry, the true interests of science; and he resolved, therefore, to invite about him the most learned scholars and physicians then residing in the capital, to meet them in his museum, to state to them his views, and illustrate his case as he went on, by specimens, rather than pictures or descriptions, of the things about which he spoke. He proposed to invite interruption, contradiction, and discussion, at these lectures; and he announced himself ready, at all times, to answer inquiries at his own house, and explain the specimens in his collection.

Palissy himself tells us,* that it was in the Lent of the year 1575 that he delivered his first course of lectures, which he proposed to continue annually. He was still delivering them in the year 1584.† He delivered them

* In the treatise "On Stones."

† In the *Bibliotèque de Sieur de la Croix Dumaine*, published in 1584, it is said of Palissy, who is described as a "natural philosopher, and man of a remarkably acute and ready wit," that he flourishes at Paris, aged sixty years and more (fifteen more; but he must have had a vigorous appearance, that would easily deceive the eye)—"he flourishes at Paris, and gives lessons in his science and profession."

in his museum. The collection of Palissy was the first cabinet of natural history that had been used more liberally than as a private hoard of curiosities in Paris; and his were the first lectures upon natural history ever delivered in that capital.

They were no idlers to whom Palissy declared his views, and of whom he invited contradiction. There was assembled in the Potter's cabinet an Academy of Science, a Royal Society evoked for the occasion. Bernard detailed the result of his original researches; and the best men of the capital were there to discuss his arguments, and subject all he said to strict inquiry.

Bernard includes, in his last work, a list of some of the chief persons who attended his first series of demonstrations, and who declared themselves convinced of the reasonableness of his opinions. The philosopher, vigorous of mind and body, at the age of sixty-six exhibited no trace of bodily decay; he was still noted, nine years afterwards, for his remarkably acute and ready wit; and his age, when it was seventy-five, seemed little more than sixty. The vigorous old man, passing from the furnace and the chamber, whose shelves were resplendent with the rich creations of his fancy, went into his cabinet, and poured out the lessons he had learned by the road-sides, by the sea-shore, and among the mountains, before a grave assemblage of men, paled by study, or grown grey with years.

Ambroise Paré was among them. He had been first-

surgeon to four kings. He was a sturdy Huguenot. His fame as a scholar has descended to our own time; and his skill as a surgeon, in saving Charles IX. from the danger that ensued upon a clumsy lancet-wound, caused him to be saved from the Massacre of St. Bartholomew. We will make acquaintance, briefly, with the chief attendants in the lecture-room of Palissy. Ambroise Paré, of the body of Master Barber-Surgeons, was a man who certainly contributed much to the advancement of surgery in his own day, though there was an unprofessional want of dulness about him, which, taken together with his innovations in practice and his heresy in religious creed, made him an object of jealousy and stout abuse among the little and loud men who create the noise in a profession. Paré introduced the method of arresting the flow of blood, after an amputation, by the use of ligatures, in place of the actual cautery. Ligatures are now universally employed,—the spouting blood-vessels are tied; but, in the sixteenth century, the custom was to burn them; and, when Gaspar Martin, the brother-in-law of Paré, died, after an amputation performed by Ambroise in his own way, a great triumph and exultation took place over the innovator. Paré was, for three years, surgeon to the Hôtel Dieu, in Paris. Between 1536 and 1543, he was surgeon to a troop of soldiers in the army of Piedmont. He then served as surgeon to companies under M. de Rohan and the dauphin. In 1544, he was with the king's army at Landrecy. In 1545, he was at

Boulogne-sur-Mer with the army against the English. In 1552, still under M. de Rohan, he served in Germany; then he was at the siege of Damvilliers, by Henry II., and at Château le Comte, under Antony, afterwards King of Navarre ; then he was in Metz during the siege. In 1553, he was in another besieged town ; and, on its capture, having been made prisoner of war, was sent home without ransom. In 1558, he was at the battle of St. Quentin; in 1562, at the siege of Rouen, at the battle of Dreux, in which the Prince of Condé and the constable were taken prisoners, and at Bourges. He was at other battles of the civil wars, and at the siege of Havre. During the Lent of 1575, he attended the public demonstrations in the cabinet of Palissy the Potter.

The mind of Ambroise Paré, in the lecture-room of Palissy, may now and then have wandered to a contest in which he was at that time engaged, touching the republication in a body of his own surgical works. He had often thought it prudent to evade the discredit that attached, in his day, to bold views and innovations on the practice of the ancients, by publishing his tracts under fictitious names. Thus " Aparice" had represented " A. Paré, C."— Ambroise Paré, Chirurgien. The doctors of medicine in Paris had obtained a decree in 1535, forbidding the publication of medical books until they had obtained the sanction of the faculty, and they were opposing at that time the independent publication of the surgical works of

Master Ambroise Paré. Paré had brought his case for argument before the Court of Parliament, and therein the suit between Master Etienne Gourmelen, Dean of the Faculty of Medicine, and Master Ambroise Paré, Barber-Surgeon, remained undecided in the Lent of 1575.

By the side of Ambroise Paré, the surgical reformer and the Huguenot, sat his friend and less illustrious collaborator, Master Richard Hubert, commonly called, according to the usage of that time, Master Richard, Surgeon in Ordinary to the King. There was a goodly array, also, of grave physicians assembled in the lecture-room of Master Bernard. In the first place, there were Master François Choisnin and Monsieur de la Magdalene, both physicians to the Queen of Navarre. François Choisnin de Chatelleraut had become, only in the preceding year, licentiate of the Faculty at Paris, and while attendant upon Bernard's first series of lectures, was engaged in preparation of the thesis which he had engaged that year to sustain, upon the theory of Periods in disease. Of this Master Choisnin Palissy speaks, in his last book, as a lover of philosophy, "whose company and visits to me were a great source of consolation." We are told of a geological excursion in which Palissy was accompanied, in this year 1575, by Choisnin, and a young scholar in medicine, twenty-two years old, named Milon. Milon also attended the demonstrations in Bernard's cabinet. He was a pupil of great promise, who afterwards became, in the year 1609, first-

physician to Henri IV., who lived to write a book about the colic of Poitou, and to be apostrophised as

"Tu Milo doctissime
Qui cuncta volvis mente perspicaci."

There were attendant also upon Master Bernard's first demonstrations, Alexandre de Campege, physician to Monsieur, the king's brother; Guillaume Pacard, a physician from Burgundy; Philibert Gilles, a physician also out of Burgundy, whose mind was then revolving a thesis upon Epilepsy; Germain Courtain, a venerable man, who publicly taught the arguments of Palissy concerning potable gold, as Doctor and Regent in the Faculty of Medicine; Jean du Pont, and Messieurs Drouyn, Clément, Misere, and de la Salle, physicians from sundry parts of France, and Pierre Pena, of the same fraternity. Pierre Pena was an able botanist, born of a noble house in Provence, whose horoscope diverted him from arms to science. He studied with so much good effect that he became secret physician to King Henry III., and left at his death a fortune of six hundred thousand livres. He and his fellow-student, Mathias de Lobel, were doctors of Montpelier. Lobel saw much of the world; he became physician to William, Prince of Orange, practised at Delft and Antwerp, was physician and "botanographer" to James I. of England, and died a Londoner in the year 1516. In conjunction with Mathias de Lobel, Pierre Pena had issued from the press of London, three or four years before

the date of Bernard's lectures, a medico-botanical work, full of research and erudition.* It was—in Latin, of course—published in England, and dedicated to Queen Elizabeth, probably because its authors were both Protestants, who saw little hope of a calm hearing in their own distracted country.

There were present also at the lectures of Palissy, Messieurs Paiot and Guerin, apothecaries of Paris, and the Marquis of Saligny in the Bourbonnois, Knight of the Order of the King. Monsieur Dal Bene was there, with his brother, the abbot, to whom Ronsard dedicated his Poetic Art. Monsieur, the brother of the abbot, was called a poet in his time, and there remains of him a Latin distich, founded on the miserable state of France, in which the shortness atones barely for the want of special merit.†

There was present also at the Potter's demonstrations Jacques de la Primaudaye, of noble family in Anjou, who had shared with his brother Pierre in those instructions which gave rise to the publication, by Pierre, of a book called "The French Academy," within a year or two of

* "Stirpium adversaria nova perfacilis vestigatio, luculentaque ad priscorum præsertim Dioscoridis et recentiorum materiam medicam.

"Quibus propediem accedet altera pars. Qua conjectaneorum de Plantis appendix, de succis medicatis et metallicis sectio, antiquæ et novatæ medicinæ lectiorum remediorum thesaurus opulentissimus de succedaneis libellus continentur authoribus Petro Pena et Mathia de Lobel, Medicis." Londini Thomæ Purfoetii, fol., 1570.

† "Gallia, quæ nunquam fuit in sua commoda constans,
In sua constanter commoda cæca ruit."

the year 1575, with which this narrative is now concerned. An ancient gentleman of Anjou had received into his house four youths, of whom the Primaudayes formed two, and placed them under an accomplished teacher, who provided pleasantly the pith of university instruction, without the tediousness of detail, and the waste of time, and words, and labour that belonged in those days to a college education. They learnt Latin and Greek, moral philosophy and history; and the results of the lessons they received formed the thick volume called "The French Academy," of which an edition was dedicated, in the month of February, 1577, to Henry III., by Pierre de la Primaudaye. Jacques de la Primaudaye, so educated, was adding to his knowledge by attendance on the discussion in the cabinet of Bernard Palissy, during the Lent of the year 1575. There were present, also, Master Jean Viret, an expert mathematician, then about thirty-two years old; Master Michel Saget, a man of judgment and good wit; Master Bartholomew, a prior, experienced in the arts, with other learned men, lawyers, scholars, and priests; among them Nicolas Bergeron, advocate, classical scholar and mathematician—a pupil of Pierre la Ramée, by whom he had been chosen to act with Antoine l'Oisel, and did act, in the year 1568, as testamentary executor in the founding of a public chair of mathematics in the Royal College of France.

Such were the men who gathered around Palissy, in

what the Potter calls* "my little Academy." Palissy placarded his proposed course of three lectures and discussions in the most frequented parts of Paris, charging a dollar for admission; and he promised, in his own quaint, fearless way, to return four dollars for every one that he received, if his teaching should admit decisive contradiction. His own account of the establishment of his lectures† and demonstrations becomes doubly interesting, when we recollect that it is an account of the first natural history lectures ever heard in Paris—of the first society established in Paris for the pure advancement of science, by discussions among learned men, which were to be held in the first natural history museum ever thrown open in that capital.

"I considered," Bernard says, "that I had employed much time in the study of earths, stones, waters, and metals, and that old age pressed me to multiply the talents which God has given to me; and for that reason, that it would be good to bring forward to the light those excellent secrets, in order to bequeath them to posterity. But, inasmuch as these topics are high and comprehended by few men, I have not dared to make the venture until, in the first place, I had ascertained whether the Latins had more knowledge of them than myself; and I was in great trouble, because I had never seen the opinion of philoso-

* In the Epistle to the Reader, of his last book.

† It occurs in the treatise "On Stones."

phers, to know whether they might have written upon the above-named things.

"I should have been very glad to have understood Latin, and to have read the volumes of the said philosophers, to be informed by some, and to detect faults in others; and thus debating in my mind, I decided to cause notices to be affixed at the street corners in Paris, in order to assemble the most learned doctors and others, to whom I would promise to demonstrate in three lessons all that I have learnt, concerning fountains, stones, metals, and other natures. And in order that none might come but the most learned and the most curious, I put in my placards that none should have admission without payment of a dollar for the entry to the said lessons; and I did that partly to see whether, by the help of my hearers, I could extract some contradiction which might have more assurance of truth than the arguments which I might lay before them: knowing well, that if I spoke falsely, there would be Greeks and Latins who would resist me to my face, and who would not spare me, as well on account of the dollar that I should have taken from each, as on account of the time I should have caused them to misspend: for there were very few of my hearers who could not elsewhere have extracted profit out of something during the time spent by them at my lessons. That is why I say that, if they had found me to be speaking falsely, I should soon have been baffled: for I had put in my placards, that if the things therein promised did not

prove trustworthy, I would restore the quadruple. But, thanks be to God, never man contradicted me a single word. Which being considered, and seeing that I could not have more faithful witnesses, nor men more assured than those in knowledge, I have taken courage to discourse to you all these things, well testified, in order that you may not doubt that they are trustworthy. And, to make you yet the more assured about them, I will give you here a catalogue of the noble, honourable, and most learned men who were present at my lectures (which I gave in the Lent of the year One Thousand Five Hundred and Seventy-five), at least of those whose names and quality I could learn: who assured me that they would be always ready to bear testimony to the truth of all these things, and that they had seen all the mineral stones and monstrous forms which you have seen at my last lectures of the year One Thousand Five Hundred and Seventy-six, which I have continued, in order to obtain an increased number of witnesses."

The character of the group which surrounded Bernard Palissy on these occasions we have already discussed. The character of the doctrines which Bernard, when they were supported by the good opinion of such friends, "took courage to discourse," we are about, in the next place, to examine. They were collected in a book, and published at Paris in the year 1580, by Martin the younger, at the sign of the Serpent, opposite the College of Cambray. They represent the highest point attained by Palissy as a philo-

sopher. By the progress of three centuries we have been brought to a position from which we can look fairly down on the thick clouds of ignorance out of which Palissy emerged, though we ourselves have reached an atmosphere by no means cloudless. From our advanced ground let us endeavour now to look back fairly on the science taught by the self-educated Potter, and compare, as we can, the views of Master Bernard with the philosophy before known to the audience, which for nine years represented annually at the demonstrations in his cabinet the wisdom of the day. Bringing the opinions of Palissy and those of his contemporaries both into requisite comparison with modern science, let us attempt to ascertain what claim the Potter had upon the admiration which he has obtained from men like Buffon, Haller, and Jussieu.

CHAPTER VI.

THE NATURALIST PUBLISHES, IN A LAST BOOK, HIS MATURED OPINIONS.

PALISSY published his third and last book—the second and last known to us with certainty—in the year 1580, he being at that time seventy-one years old. It was dedicated by him to his ancient friend and patron, who was then probably still older than himself, the Sire de Pons, the same who had interfered on his behalf, and assisted in procuring his liberation from the prisons at Bourdeaux. The Sire de Pons, Count of Marennes, had been admitted a knight of the order of the Holy Spirit at the promotion which took place in the year 1578. "To the very high and very powerful lord, the Sire Antoine de Pons, knight of the orders of the king, captain of a hundred gentlemen, and his majesty's very faithful councillor," Palissy writes his dedication in the manner following :-

"The number of my years gives me the boldness to tell you that one day I was considering the colour of my

beard, which caused me to reflect upon the fewness of the days which remain to me, to end my course: and that has led me to admire the lilies and the corn, and many kinds of plants, whose green colours are changed into white, when they are ready to yield up their fruits. Many trees also very soon look hoary when they feel their vegetative and natural virtues to have ceased; a like consideration has reminded me that it is written, that one should take heed not to abuse the gifts of God, and hide the talent in the earth: also it is written, that better is the fool who hides his folly than the wise man who conceals his wisdom.

"It is therefore a just thing and reasonable," Palissy continues, dwelling on the spirit of that parable which formed the mainspring of his industry—"it is a just thing and reasonable that each should seek to multiply the talent that he has received from God, following His commandment. Wherefore I have studied to bring into the light the things of which it has pleased God to give me understanding, according to the measure which it has pleased Him to bestow upon me, for the profit of posterity. And because many under good Latin or some other polished tongue, have set abroad many pernicious talents to mislead and cause the loss of time to youth: forasmuch as a Geber, a Romaunt of the Rose and a Raymond Lully, and some disciples of Paracelsus and many other alchemists have set abroad books of a study by which many have wasted time and thrift. Such pernicious books have caused me to

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scratch in the earth for the space of forty years, and search among the entrails of the same, in order to understand the things which she produces in herself, and by such means I have found grace before God who has caused me to understand secrets which have been to the present time unknown to men, even to the most learned, as any one may understand from my writings contained in this book. I know well that some will jest, and say that it is impossible for a man destitute of Latin to have intelligence concerning the things of nature; and they will say that it is on my part great temerity to write contrary to the opinion of so many famous and ancient philosophers, who have written upon natural facts and filled the whole world with their wisdom. I know also that others will judge by the outside, saying that I am no more than a poor artisan: and by such discourses they would cause my writings to be ill received. In truth, there are things in my book which the ignorant will find it hard to believe.

"Notwithstanding all these considerations I have not ceased to pursue my enterprise, and to cut the thread of all calumny and delusion I have arranged a cabinet, in which I have put many things note-worthy and monstrous, that I have taken from the womb of the earth, which bear certain witness to my teachings, and no man will be found who will not be constrained to own that they are trustworthy, after he shall have seen the things that I have prepared in my cabinet, to give assurance to all those who would not otherwise put faith in my writings.

If there should chance to come one blockhead, who would not accept the evidence placed in my cabinet, I would require no other judgment than your own, which is sufficient to convince and overturn all the opinions of those who would oppose it." The good old Sire de Pons must have been indeed a giant-killer in debate, if this were so; but Bernard speaks not in flattery, but in the partiality of friendship to his ancient patron. "I speak it in truth," he says, "and without any flattery: for inasmuch as I had good proof of the excellence of your wit, since the time when you returned from Ferrara* to your château of Ponts; so it is that, in these later days in which you have been pleased to speak to me of divers sciences, to wit of philosophy, astrology, and other arts drawn from mathematics; that I say has caused me to double the assurance and conviction of your marvellous ability; though number of days causes in many people diminution of the memory, yet so it is that I have found yours augmented rather than diminished. This I have learnt by the conversations which it has pleased you to hold with me; and for these reasons I have thought that there is no seigneur in the world to whom my work could be more fitly dedicated than to you, knowing well that while it might be esteemed by some as a fable full of falsehoods, by you it will be prized and accounted a

* He had relations there. Jacques, father of Antoine Sire de Pons, had married Catharine of Ferrara. Antoine himself married Anne de Parthenay, daughter of the Seigneur de Soubise.

rare thing. And if there be in it any words ill-polished, or ill-arranged, you will know well how to extract the substance of the matter and excuse the too rude language of the author; and having such hope, I will pray you very humbly to do me this honour, to receive it as from the hand of one of your very humble servants."

The book thus dedicated to the Sire de Pons, and containing the mature fruit of the studies of the naturalist, bears the following title:* "Admirable Discourses on the Nature of Waters and Fountains, as well natural as artificial; on Metals, on Salts and Salt-springs, on Stones, on Earths, on Fire and on Enamels. With many other excellent Secrets of natural Things. Also, A Treatise on Marl, very useful and necessary for those who are concerned in Agriculture. The whole drawn up in Dialogues, wherein are introduced Theory and Practice. By M. Bernard Palissy, Inventor of Rustic Figulines to the King, and to the Queen his mother." It was published at Paris, in one volume octavo, by Martin le jeune, at the sign of the Serpent, opposite the College of Cambray.

All the theories of Palissy were founded upon, and tested by, experiment and observation. Speculations upon

* "Discours Admirables de la nature des eaux et fontaines, tant naturelles qu'artificielles, des métaux, des sels et salines, des pierres, des terres, du feu et des émaux; avec plusieurs autres excellents secrets des choses naturelles. Plus, un traité de la marne, fort utile et nécessaire à ceux qui se mellent de l'agriculture. Le tout dressé par dialogues, ès quels sont introduits la théorique et la practique. Par M. Bernard Palissy, inventeur des rustiques figulines du Roy, et de la Royne sa mère."

nature, founded upon any other basis, pure products of the mind, under the name of Theory, as something opposite to practical investigation,—elaborations out of Latin into Latin,—Bernard seldom omits any occasion to discourage. His own lessons were learned by a process much more wholesome, and produced in him a robust and healthy intellect. To the readers of his book, whom he addresses after he has concluded his dedication to the Sire de Pons, Palissy expresses in stout terms this feeling. It was most especially essential, in a day when study of the works of nature was but young upon the wing, weak as a fly, and making in its inexperience rash tours among the cobwebs to which Palissy so earnestly exhorted application of a broom.

"Friend reader," he says, "the desire I have that you may profit by the reading of this book, has incited me to warn you that you should take heed against the weakening of your wit over sciences written in the chamber by the prompting of a theory either imaginative or picked out of some book written from the imagination of those who have experience in nothing, and take heed how you believe the opinions of those who say and maintain that theory has engendered practice. They who teach the like doctrine assume an argument ill founded when they say, that one must imagine and figure the thing one desires to compass in the mind before putting a hand to the business. If man could compass his imaginations I would be of their side and opinion: but it must needs be

that if things conceived in the mind could be executed the bellows-blowers* of alchemy would do great things, and would not waste, as many have done, fifty years upon a search; if theory figured to the mind of chiefs in war could be reduced to practice, they would never lose a battle.''

"I venture to say to the confusion of those who hold such an opinion, that they could not make a shoe, nor even a stocking-heel, if they knew all the theories in the world. I would ask those who hold such an opinion, if they should have studied fifty years in books of cosmography and navigation of the sea, and should have maps of all the regions and the lead, the compass and the astronomical instruments, would they for all that undertake to guide a ship to all countries as would be done by a man of good experience and practice; they would shrink from putting themselves into danger, whatever amount of theory they might have learnt: and when they should have well discussed the matter, they would of necessity confess that practice is the source of theory. I have put this proposition foremost, to close the mouth of those who say, how is it possible that a man can know anything and speak of natural effects, without having seen the Latin books of the philosophers? Such a pro-

* *Souffleur* was a name given to an alchemist. I "have experience in nothing" of the matter, but imagine a theory, in suggesting that our phrase, "he may whistle for it," used when a man cannot get what he is foolish in expecting, might possibly be traced up to the bellows of the alchemist.

position is in my case apposite, because by experiment I prove in several places that the theory of several philosophers is false, even of the most renowned and the most ancient, as any one may see and hear in less than two hours, provided that he will take the trouble to come and see my cabinet, in which may be seen wonderful things that are put there for witness and proof of my writings, arranged in order, or by stages, with certain writings under them, in order that every one may be able to instruct himself: being able to assure you (reader) that in very few hours, that is to say in the first day, you will learn more of natural philosophy in as far as it concerns the subjects treated in this book, than you could learn in fifty years by reading the theories and opinions of the ancient philosophers. Some enemies of science mock at astrologers and say, Where is the ladder by which they got up to heaven to find out the situation of the stars? But in this place I am exempt from that kind of ridicule; because in the proof of my written arguments I content the sight, the hearing and the touch: for which reason the calumniators will have no ground of their own in my case: as you will find when you shall come to see me in my little academy. Fare thou well."

These addresses formed the only prefatory matter to the book, which appeared without any of the usual recommendatory verses: such vanities old Bernard had outlived. As the volume was passing through the press, however, a new thought suggested itself to the earnest-

minded author, and a short notice was appended to the other prefatory matter.

"Since the book has been put to press," adds Bernard, "several people have requested me to read it to them, in order that they might have more certain understanding of difficult parts, which has induced me to write what follows: to wit, that if after the printing of the said book, there should be any one who does not content himself with having seen the things privately in writing, and desires to have an ample interpretation, let him repair to the printer, and he will tell him the place of my abode, in which I shall be found at all times ready to read and demonstrate the things herein contained.

"Also, if any one should wish to establish a fountain, according to the design here given, and should be unable to understand clearly the meaning of the author, I will make a model for him by which he will easily understand what is here written."

It is the same Bernard still. The uncaged energy with which the Potter, in his old age, labours for the interests of science, and the beautiful simplicity of mind with which he follows the directest path to a good object, remind us of the struggles of his manhood, and the eccentricity that made him acceptable meat for gossips when he hungered and grew lean over his work in Saintes.

CHAPTER VII.

DOCTRINES OF PALISSY: WATER AND WATER-WORKS —MEDICINAL AND THERMAL SPRINGS—VOLCANIC ACTION.

"THEORY" commences: "I found myself, some time ago (while wandering over the fields), very thirsty, and passing by some village I asked where I could meet with a good spring, in order to refresh myself; to which it was replied to me that there was no spring in that place, and that their wells were all exhausted, on account of the drought, and that there was nothing but a little muddy water at the bottom of the said wells. This caused me much vexation, and I was greatly surprised at the distress suffered by the inhabitants of this village through the want of water. And then there came to my memory a promise made by you long since, to show me in what way fountains might be established in places the most destitute of water. Therefore now since we are at leisure, I beg you (according to your promise) to instruct me in this

science which will be extremely useful to me : for I have an inheritance in which there are no springs, and there is nothing in it but a well liable to become dry like others."

To this invitation "Practice" replies ; and thus in a natural and easy way Palissy commences the enunciation of his views concerning different kinds of water, and the theory of springs.

He commences with a statement of objections against wells and pumps. We shall find him at the close of his dialogue advocating surface-drainage, and he begins, therefore, with comments upon well-water extremely similar to those which have been supplied to us within the last two or three years by our own Sanitary Board. Although in France, three centuries ago, wells were sunk clumsily, skilled workmen were rare, and pumps for deep wells were expensive, unwieldy, and extremely liable to disrepair, it must be confessed, that in paving the way for his own suggestions of an improved water-supply, Palissy rather overstates the case against existing methods.

Very costly works had been suggested to many princes and seigneurs for water-supply on a large scale by the agency of pumps ; and while he wrote, Palissy tells us, there was a little mania for such works, which very often absolutely failed, and always cost much money in repairs. We know now what precaution is required to prevent the clogging with sand or mud of the pipes that dip into a stream; we know the difficulty that would be occasioned by the passages into them of air; and we know how to

adapt the strength of the material to the hydrostatic pressure, and to adjust the bore and inclination of the whole system of water-pipes with mathematical exactness. Such calculations in or about the year 1850 form part of the duties of a civil engineer. To the contemporaries of Bernard Palissy, in the year 1580, such calculations were almost unknown.

The rude machinery that had been long employed in mines and ships was insufficiently adapted to new purposes. The friction upon water-wheels and tubes and suckers, in the case of all works upon a large scale, tended rapidly to the destruction of the apparatus. Mud and air would and did get into the pipes, and water-works of this nature were in consequence most costly undertakings. This Bernard saw and pointed out. The wretched state of industrial art in his own day being remembered—for the war in Italy, and afterwards the civil wars, had almost extinguished the race of enterprising artisans—we shall not be surprised if we find Bernard speaking as though pumps were to remain unimproved. He admires their use in mines, and values them for the additional safety they secure to ships. "I do not despise the invention of pumps," he says, "but on the contrary I esteem it much; and whoever invented them" (it is said to have been Ctesibius, about 120 years B.C.), "did so after great consideration, and not without reflecting upon the anatomy of the human body. * * * And while I esteem the invention of the said pumps to be marvellously great,

and know that they will be at all times in request and useful both to ships and mines, yet so it is that for domestic wells they will be little in request; because there is always need of workmen in the neighbourhood, on account of fractures occasioned by different kinds of violence, and there are very few men who know how to repair them."

The foresight of Palissy certainly failed him in this portion of his subject. Domestic pumps continued to be alike clumsy and costly for more than a century after the year 1580, and of course, also, they did not extensively supplant the ordinary springs and draw-wells. In our own day we find them in use, but threatened with banishment from many towns, if blue books can prevail on urban populations to procure for themselves surface-water, and supply it to all houses at high pressure.

Palissy had a little malice in his composition. He evidently is not fond of the queen's architect, Philibert Delorme, who was associated with Bullant in the founding of the Tuileries, and took the lead, by virtue of superior genius, superior wealth, and more assuming ways. In reputation as an architect, Delorme yields to no French contemporary except Pierre Lescot, and takes a questionable precedence of Bullant. In practice he was probably the most prosperous architect of his own day. He governed the works of Catherine of Medicis at the Tuileries, at Anet, Saint Maur des Fossés, St. Cloud, and elsewhere. As Palissy worked at the gardens of the

Tuileries, and Delorme had a taste for garden architecture and original ideas on water-works, the Potter doubtless found himself subject to more interference than he liked, and resented Delorme's affectations of superiority. Delorme had met at first with serious mishaps in the watering of the famous Garden of Meudon, for the Cardinal Guise, Charles of Lorraine. His works, modified subsequently by Mansard and Le Nôtre, have made Meudon famous. It is to this enterprise that Palissy alludes in dwelling with malicious pleasure on Delorme's early mischances. "I know," he says, "that there has been a French architect in our time, who almost caused himself to be styled the God of Masons or of Architects; and inasmuch as he possessed twenty thousand in benefices, and knew how to make his way at court"—(he had been councillor and almoner to Charles IX., was abbot of St. Eloy les Noyon, of St. Serge by Angers, &c.)—"it happened that he boasted sometimes of being able to make water rise as high as it pleased him by means of pumps or machines, and by such self-assertion he induced a great lord to wish to raise the water of a river to a high garden which he had near the said river. He commanded that money should be paid over to meet the cost: which being accorded, the said architect caused to be made a great number of leaden pipes, and certain wheels in the river, to cause the movement of the mallets by which the suckers are set in action. But when this came to raise the water, there was not a pipe that did not burst, because of the violence of the air

enclosed with the water; then having seen that the lead was too weak, the said architect commanded that with all diligence there should be cast pipes of brass, upon which work were employed a great number of founders, in such wise that the expense of these things was so great, that it has been found by the papers of the controllers to have amounted to forty thousand francs, although the result was not worth anything."

Soon afterwards, in the same essay, Palissy finds another occasion to play critic against the Masons' God. "If Monsieur the queen's architect, who had visited Italy, and who had gained authority and command over all the artisans of the said lady" (all the artisans, and Palissy was one of them), "had only had ever so little natural philosophy, without any letters, he would have caused some wall or arcade to be made across the valley of St. Cloud, and thereby have brought his water gently from the bridge of St. Cloud to the park walls," &c.

In the works of Ronsard there is an anecdote concerning Philibert Delorme which illustrates the character of the great architect, and the temper of authority and command which ill became a man of genius, and before which the spirit of Master Bernard of the Tuileries was certainly not likely to submit. Ronsard one day was about to pass into the Tuileries in the suite of the queen-mother, when Delorme caused the door to be shut in his face. The Sieur de Sarlan caused it to be immediately opened to him, and Ronsard, entering, took up a piece of chalk, and wrote in

capitals upon the door, before the face of the church pluralist and architect, FORT REVERENT HABE. Habe, equivalent to Hâve, was a term of reproach, meaning a meagre person, "a wrinkled or scraggy old woman," as the dictionary has it, and the term probably applied with some force to the person of the architect, while the Very Reverend might be applied sarcastically to his clerical revenues, or to his overbearing claim on reverence. It will have been observed that Palissy speaks of the architect always as "commanding." Delorme, offended by Ronsard's inscription, brought his complaint before the queen; but the offender, being summoned to answer for himself, informed her majesty that what he had written was not a scurrilous insult, but a delicate reproof. "Fort Reverent Habe are not French words, madame, but the commencement of a verse out of Ausonius: Fortunam reverenter habe—Be modest in prosperity—words profitable to be read by all men to whom fortune has been kind."

Palissy then having stated the mechanical objection against pumps, and taken occasion thereby to ease his mind by administering a passing rebuke or two to the proud Philibert Delorme, proceeds to discuss the different qualities of well-water. He points out that the water in some wells is better than that in others, and that the difference is owing to the differences in the soil through which the rain-water has percolated. He points out that wells in towns become injured by the filth that passes

through the soil. He speaks of the poisoning of wells in seasons of strife—a popular error which subsisted long after his time, and was supported by the evidence of grave historians. Palissy himself refers for authority to the historical memoir of Jean Sleidan. He relates that "during the war which the Emperor Charles V. waged against the Protestants, several wells and still waters were poisoned, and that a man was taken who confessed to having come from a far country expressly for the doing of this wicked deed, and this by the command of two great personages, whom I will not name." He then without comment relates an instance of the death of several workmen who were sent down to repair a well, and tells a legend of a physician, who, being in want of money, drugged all the wells in his own town, and caused people to come to him with stomach-aches, and be cured, to their great joy, by a precious medicine, which was, in fact, good wine, they being at the same time forbidden to drink any water.

Against shallow pool-water, Bernard produces all the obvious objections. Against the water gathered in deep pools for domestic use, according to a practice prevalent in Normandy and elsewhere, Palissy objects only that as the water stagnates, it is apt after a time to put on a green coat, and to become unwholesome. Closed cisterns he considers preferable. Being about then to pass from still waters to fountains, he is warned by "Theory" that

to find fault with fountains is to find fault with the works of God.

"You reprove me before I speak," he answers. "I know well that the sources of natural fountains are made by the hand of God; but that is no reason why I should not speak of the faults committed in conducting the waters from their natural sources: inasmuch as they who conduct the springs through pipes, channels, and aqueducts from the source to the houses, towns, and castles, may commit great faults, that is the subject upon which I mean to speak. * * * If you will contemplate a little the vestiges and antiquities of our predecessors, you will find a great number of ancient pyramids constructed as well by the Roman emperors as by the kings of Egypt; you will find also a great number of triumphal arches constructed in the time of the Cæsars, as you have seen two triumphal arches in the town of Xaintes, which, though they have been founded in the waters,* yet are still erect; and one cannot deny that they are of the time of the Cæsars, as the writing that is upon them witnesses. I have begun with speaking about this, in order to show you that although our predecessors incurred also great expense for their aqueducts, pipes, and the beauty of their fountains, yet so it is, that you could not show me a single ancient fountain as you can show the buildings of triumphal arches, palaces, and amphitheatres: and it must not on that account be thought

* Compare vol. i., page 105.

that our ancient predecessors did not study and spend great cost as well on fountains as on other buildings, and in proof that they did so, some one has assured me that he has seen in Italy aqueducts of fifty leagues in length (a most incredible thing) which were made for bringing water out of one place to another. Our ancients show by that how well they knew that waters brought by aqueducts come more at their ease than those which come enclosed in pipes. It is certain that at Xaintes (which is an ancient town, in which are still found the remains of an amphitheatre and many antiquities, likewise a great quantity of coins of the emperors) there was an aqueduct, of which the vestiges remain, by which they caused the water to come from a distance of two great leagues from the said town, and nevertheless, its ruin has been so complete, that there are now few men who understand the vestiges of the above-named aqueduct. That is why I have said, that although the ancients used better material than the moderns, and although they cared less about cost, yet there are no ancient fountains to be found. I do not mean to say that we have lost their water sources: for it is well known that the ancient spring of the town of Xaintes is still on the spot in which it formerly existed: to see which the Chancellor l'Hôpital turned out of his way (returning from the journey to Bayonne) to admire the excellence of the said spring. There are still in certain valleys, between the town and the spring, some arcades over which the waters of the said

spring were made to pass: the meaning of the said arcades being however unknown to the common people. And if you wish to know why I place before your eyes these arcades in the valleys, it is to show to you the ignorance of the moderns."

Palissy proceeds accordingly to a comparison between these aqueducts and the water-pipes of about two inches diameter running underground up and down hill, always containing enclosed air, frequently bursting, often clogged by root-fibres, which penetrate between the joints, or by the deposit of stony matter from the water. He refers to the famous Pont de Gard, in Languedoc, which was made to span the valley between two mountains for the purpose of conducting water to the town of Nîmes. He admires the grand system of water-supply for which Rome is celebrated, and then touches upon the failure of Delorme in the water-works which he had undertaken at St. Cloud.

Palissy then teaches the reason of the great differences that exist in the character and quality of springs. It is impossible, he says, that water can pass through the earth without taking up from it various salts that it contains; and as there are different kinds of earth in which the salts vary both as to quantity and kind, these differences will be represented in the waters. "I have never," he says, "seen a stranger come into the region of Bigorre to dwell there who did not take soon afterwards a fever: one sees in the said region a great number of men and women who have the throat as large as two fists; and it is a cer-

tain thing that the waters have caused their malady, whether it be by their coldness or by the minerals through which they have passed."

The alternative of coldness in the water as a cause of goître Bernard adopts from Pliny,* whose natural history he quotes upon another point in the succeeding sentence. The suggestion that it is caused by matter taken from the earth and held by the water in suspension or solution, is the theory of Palissy himself, and doubtless the correct one. He adduces goître as an example of the effect of waters altered in quality "by the minerals through which they have passed." The old belief that goître, Derbyshire-neck, or, as physicians call it, bronchocele, is produced by the use of snow-water, although not yet by any means dead, is yielding before a theory which Palissy was certainly the first man to suggest. Our own phrase for the disease—Derbyshire-neck—discredits the old notion very much. There is little snow-water in Derbyshire, and in the south of England, where we find goître common. In Scotland, where there is snow, goître is a rare complaint. In Greenland, where all the water in use is snow-water, there is no goître at all, and there is a great deal of goître in Sumatra, where snow is never to be seen. In Switzerland there is a good deal of the disease, but they who live at the greatest height upon the mountains, and depend most directly on the snow and the glaciers, are

* Lib. ii., cap. 37. Palissy read in translations Pliny, Plutarch, and Vitruvius, all of whom he quotes upon occasion.

precisely the people among whom it is not found. An able Swiss physician* tells us: "Bronchocele appears to me to be produced by certain waters which issue from the hollows of rocks, trickle along the cliffs of mountains, or spring from the bowels of the earth. That this is the case I may instance some fountains in my own country, the use of whose waters will in eight or ten days produce or augment goitrous swellings. Such of the inhabitants of my village (Hameau de Thuet) as avoid these waters are free from goître and cretinism." Another authority of equal weight informs us that the pump-water of the lower streets of Geneva brings on goître very speedily.

Palissy proceeds further to prove the existence in the earth of salts and other matters, by the instances of petroleum, of bitumen, of sulphuretted waters, and of waters tinted with the hue that belongs to the rocks from which they have issued. Theory declares himself to be contented with his arguments, and wishes to understand the cause of thermal springs. Palissy immediately, with a wonderful correctness of perception, ascribes these phenomena to the same cause which produces earthquakes and volcanoes.

The theory of the earth, by which it is regarded as a molten mass, cooling at the surface while it flies through space, was born long after the time of Palissy, and still exists. The most philosophic geologist of our own day has shown that the central heat required according to the

* Dr. Bally, quoted in Forbes's Cyclopædia of Practical Medicine. The next writer is Dr. Coindet, quoted through the same authority.

theory is incompatible with the solidity of the surface, and suggests the much more rational doctrine that "instead of an original central heat, we may perhaps refer the heat of the interior to chemical changes constantly going on in the earth's crust; for the general effect of chemical combination is the evolution of heat and electricity, which in their turn become sources of new chemical changes."*

Palissy knew nothing of the heat generated by chemical combination, and was compelled to seek through his experience for some first cause of internal heat that lay within his comprehension. He suggested as a cause the falling or friction of one rock upon another in the neighbourhood of a bed of sulphur, coal, peat, or bitumen; thus a spark might be communicated to inflammable material, and a combustion would in this way be set up that would continue while it found material to feed upon. The water that passes in the neighbourhood of these beds would become heated, but not without producing great disturbance, for to the meeting underground of water, air, and fire—in truth, to the expansive force of steam and gases, although he was not able to grasp clearly the whole of his idea—Palissy ascribed all earthquakes. His doctrine on earthquakes and volcanoes—of which the true theory is at this hour open to conjecture—is the best that human genius could have suggested in the year 1580. Probably the sudden expansion of gases that had been compressed into a liquid form plays a large part in producing the volcanic

* Lyell's Principles of Geology.

phenomena. Certainly "water and fire," as Palissy would say, go to the making of a volcano, if we may draw any conclusion from the fact that almost every existing volcano is in the neighbourhood of an existing coast. The few exceptions to this rule are in the New World, Jorullo, Popocapetl, and Fragua; respectively not more than 80, 132, and 156 geographical miles from the sea; and the volcanoes of the Celestial mountains in Central Asia. These last are situated in the basin of the continental streams where rivers flow into a multitude of lakes instead of to the ocean.

How wonderfully all the speculations of Palissy upon this subject struck into the right path towards truth, and how far he had gone beyond the speculations of his own time, it is due to his memory to understand. In the year 1850, one of the best works devoted to the study of natural history* contained the statement following:

"The real cause of volcanic phenomena is as yet, in a great measure, involved in obscurity. Two theories have been proposed to account for the phenomena: one, that they are due to the expansion and oscillation of melted matter in the earth's interior; the other (that proposed by Sir H. Davy), that the elementary earths and alkalies in their metallic states, coming in contact with water infiltrated through fissures, immediately commence a chemical action, and hence arises in consequence a great expansion of volume; whilst the expansive force of vapour or gas,

* Johnston's *Physical Atlas.*

produced during the process of decomposition, increases the tension of the liquefied substance, until it acquires sufficient strength to overcome the resistance of the superincumbent mass, upheaves the solid earth, and finds for itself a permanent outlet. The mineral composition formed from the lava emitted, differs according to the nature of the materials of which the lava is formed, the degree of heat in the interior, the rate at which the molten mass is cooled down, and the amount of pressure to which it has been subjected."

In the year 1580 Palissy wrote the following opinion:

"Earthquakes cannot be engendered unless in the first place fire, water and air do come together. Some historians relate that in certain countries there are earthquakes which have lasted for the space of two years (a thing very easy to believe), and that can happen by no other means than the above named. It is necessary that before the earth can tremble there should be a great quantity of one of those four matters (sulphur, coal, peat or bitumen) in combustion, and being in combustion that it should have found in its way some receptacles of water in the rocks, and that the heat should be so great as to have power to cause the boiling of the waters enclosed in the rocks, and then from the fire the waters and the enclosed air there will be engendered a vapour that will come to lift by its power rocks, lands and houses that shall be upon them. And inasmuch as the violence of the fire, the water and the air, will be unable to cast to the one side or

the other so great a mass, it will cause it to quake, and in quaking it will produce some subtle openings, which will give a little air, and by such means the violence by which otherwise all would have been overthrown is pacified; for if the three matters which cause the trembling did not get a little air during their action, there is no mountain so heavy that it could not be overthrown, as it has occurred in several places that mountains have by earthquakes been converted into valleys, and valleys into mountains by the same action.——Would you have me tell you the philosophic book in which I have learned these secrets? It has been nothing but a cauldron half full of water, in the boiling of which when the water was urged a little briskly by the fire at the bottom of the cauldron, it rose until it flowed over the said cauldron: and that could only be because there was some wind engendered" (wind, in the philosophy of Palissy, was air stirred by the removal of a compressing force) "in the water by virtue of the fire: inasmuch as the cauldron was but half full of water when it was cold, and was full when it was hot."

Contrast now this remarkable passage, in which the uneducated Potter almost seizes half a dozen of the mysteries of nature, with the reasonings upon nature prevalent in his own time. We will pass even on into the next century, and take for our example no less a philosopher than Kepler, who published a work in 1619 on the Harmonics of the World. His opinions are thus epito-

mised by Cuvier:* "The globe possesses living faculties. A process of assimilation goes on in it as well as in animated bodies. Every particle of it is alive. It possesses instinct and volition even to the most elementary of its molecules, which attract and repel each other according to sympathies and antipathies. Each kind of mineral substance is capable of converting immense masses of matter into its own peculiar nature, as we convert our aliment into flesh and blood. The mountains are the respiratory organs of the globe, and the schists its organs of secretion. By the latter it decomposes the waters of the sea, in order to produce volcanic eruptions. The veins in strata are caries or abscesses of the mineral kingdom, and the metals are products of rottenness and disease, to which it is owing that almost all of them have so bad a smell." Even after the world had passed into the eighteenth century, science was in many respects far behind the point that had been reached by Palissy. In 1708, Scheuchzer is found maintaining, in the Mémoires of the Academy, that God lifted up the mountains in order to drain off the waters of the deluge, and that they were made strong in order that they might stand properly upright.

Palissy then, having assigned to thermal springs their true position in connexion with volcanic action, proceeds to discuss their medicinal use. He explains that the

* Essay on the Theory of the Earth.

medicinal use of springs will vary according to the medicinal matters which they may have taken up from the earth; that some may be useful in one case, some in another; but he ridicules all extravagant expectation. A practical physician of the present day could not speak more soberly or sensibly upon the subject, although long after the days of Palissy the most ludicrous credulity was prevalent, even among the learned, upon the subject of the virtue that resides in springs. A reference to the early records of our Royal Society, contained in the first numbers of the Philosophical Transactions—dating nearly a hundred years after the time of Palissy—will give us plenty of grave details on baths that possessed the virtue of conferring health or beauty. One writer* considers negroes to have been blackened by subterranean steams.

Palissy points out that these subterranean steams and thermal springs which issue from the earth, act as safety-valves, and tend to abate the violence and frequency of earthquakes. "There is no violence," he says, "or quaking where the fire can take breath by little holes, though they be as in some places they are seen, no bigger than worm holes. In the same way it happens with that which heats the water of the baths, because it takes

* Philosophical Transactions, No. 57 (1669). He says: "Subterranean steames, perhaps, may be of so many kinds and mixtures as to cause much of the great diversities of metals, minerals, earths, and soyles; * * yea, of the furres, hayres, wool, and other little varietys in animals (particularly in sheep)—I will not except *the Ethiopick hue* and humors of men in distant climates."

breath by the channel of the said waters." The best comment upon this opinion will be a passage from the best modern work upon the subject of which Palissy is treating.* "Steam of high temperature," says Sir Charles Lyell, "has continued, for more than twenty centuries, to issue from the 'stufas,' as the Italians call them; thermal springs abound not only in regions of earthquakes, but are found in almost all countries, however distant from active vents. It is probably to this unceasing discharge of subterranean heat that we owe the general tranquillity of the globe; and the occasional convulsions that occur may arise from the temporary stoppage of the channels by which heat is transmitted to the surface."

Up to this point, the doctrines of Palissy contained in the present treatise display a philosophy that is entitled to our high respect. He is, upon all subjects that are connected with a study of nature, a century or two in advance of the men of his own time. The opinions narrated in the present chapter have, however, chiefly represented truths almost attained, rather than regions of knowledge absolutely conquered. In the next and most interesting portion of the essay, we shall find Palissy teaching the true doctrine of springs, propounding for the first time to the world a great cosmical idea with absolute correctness, and proving his position by a train of the best and purest philosophic reasoning. The reasoning of the artisan, written in unassuming French, fell

* Lyell's Principles of Geology.

among pedants, and produced no fruit. The practical application of his theory to a system of water-supply, by surface-drainage, forms the concluding portion and main object of his essay. He had prefaced it, he says, with an exposition of the views of nature upon which it was founded. "Because it is impossible to imitate Nature in any point whatever, if we have not first contemplated the effects she produces, taking her for guide and exemplar, since there is nothing in the world wherein perfection can be found, excepting in the works of its Creator. Taking example then by those beautiful formularies which He has left to us, we come to the imitation of the same."

Bernard's doctrine on this head, as we shall presently perceive, does not form one of his least important claims upon the recollection of posterity.

CHAPTER VIII.

DOCTRINES OF PALISSY: THE FOUNTAIN AND THE FLOOD.

SPRINGS were supposed, long after the time of Palissy, to be supplied by secret conduits from the sea, which carried sea-water to reservoirs in mountains. The water in the reservoirs being then vaporized, ascended and condensed upon the cavern-walls to trickle through the crevices of rock, pure and distilled, as water that has been distilled from an alembic. Descartes is sometimes called the author of this theory: he certainly supported it; but that it was not of his invention will be obvious enough from the fact that we find Palissy disproving the same notion as an opinion common among the philosophers in 1580, sixteen years before Descartes was born.

In the "New Dictionary of Natural History," an encyclopædia of existing knowledge on that subject, published in very many volumes between the years 1816 and 1830, M. Patrin writes the article on springs. After narrating

"the most popular theory, that of Descartes," he declares it to be an error. Springs, he says, are caused by condensation of vapour, chiefly in the night, upon the tops of mountains. They are produced by the trickling down of the water in a way that corresponds entirely with the trickling down of drops that have condensed on cold glass-bottles. So little notice did the poor man speaking simple French obtain among the Latinist philosophers of his own day; so little was philosophy cherished by the French themselves during that age of civil discord, that the theory of springs, expounded perfectly and very beautifully by Master Bernard of the Tuileries in the year 1580, perished of neglect; and in a work of great pretension published by French naturalists a quarter of a thousand years after the demonstrations in the cabinet of Palissy, the true theory of springs was still unknown.

By his immediate hearers Bernard's doctrine was accepted; and a few men, who read his books before they passed from obscure fame into unmerited oblivion, made practical use of his suggestions.* But by the body of his countrymen, in his own day, the character of Palissy as a philosopher was not appreciated. He was one or two—now and then even three—centuries in advance of his own time, so that his own time had not ears to hear him with. Moreover, France was busy upon other matters, and had

* Fontenelle, in his eulogy on Couplet, gives an instance in the case of Coulanges-la-Vineuse. Some details will be found among the notes to the Appendix.

no leisure to think for half a minute about springs of water, while there prevailed a more engrossing interest in pools of blood.

"When for a long time," says Bernard, "I had closely considered the cause of the sources of natural fountains and the place whence they might proceed, at length I became plainly assured that they could proceed from or be engendered by nothing but the rains."

THEORY replies: "After having heard your opinion I am compelled to say that you are a great fool. Do you think me so ignorant that I should put more faith in what you say than in so large a number of philosophers who tell us that all waters come from the sea and return thither? There are none even to the old men who do not hold this language, and from all time we have all believed it. It is a great presumption in you to wish to make us believe a doctrine altogether new, as if you were the cleverest philosopher.

"PRACTICE.—If I were not well assured in my opinion, you would put me to great shame: but I am not alarmed at your abuse or your fine language; for I am quite certain that I shall win against you and against all those who are of your opinion, though they be Aristotle and the best philosophers that ever lived; for I am quite assured that my opinion is trustworthy.

"THEORY.—Let us come then to the proof. Give me some reasons by which I may know that there is some likelihood in your opinion.

"PRACTICE. My reason is this: it is that God has fixed the borders of the sea, beyond which it shall not transgress: as it is written in the Prophets. In effect we see this to be true, for inasmuch as the sea is in several places higher than the earth, while, at any rate, it has some height in the middle; yet at the extremities it keeps within measure by the command of God, in order that it may not come to submerge the earth.*

"We have very good witnesses of these things, and among the works of God that is greatly marvellous, for if you had taken heed to the terrible effects of the sea, you would say that it appears to come from twenty-four hours to twenty-four hours twice to assail the earth, desiring that it should be ruined and submerged. And its coming is like to a great army which might come against the earth to combat it: and its front, like the front of battle, breaks impetuously against the rocks and limits of the earth, bringing a noise with it so furious that it seems bent upon destroying all. And because there are certain channels on the borders of the sea in the surrounding land, some have built mills on the said channels, to which there

* Palissy refers only to the height of the waves. It appears afterwards that he fully understands the principle of water finding its own level. It is true that there is land below the sea level. The Dead Sea is 1300 feet below the level of the Mediterranean, and all the land about the Caspian is depressed. The level of the sea, also, in mediterranean seas and gulfs, is affected by local circumstances, and does not at all times correspond with the level of the open water. The direction of the wind, for example, at certain seasons of the year, raises the level of the Red Sea towards Suez.

have been made several gates for allowing sea-water to come into the channel at the rising of the tide: in order that whilst coming it may cause the said mills to grind, and when it is about to enter the channels, finding the gate closed, and having no servant fitter than itself, it opens the gate, and causes the mill to grind for it a welcome. And when it wishes to retire, like a good servant, it shuts for itself the door of the channel, in order to leave it full of water, which water is made afterwards to pass out by a narrow opening, so that at all times it may cause the mill to grind. And if it were as you say, according to the opinion of the philosophers, that the sources of springs came from the sea, it must needs follow that the waters would be salt, like those of the sea, and, what is more, it would follow that the sea must be higher than the highest mountains, which is not the case.

"*Item.* As it happens that the water which has entered the channels and causes the mills to grind, and which conveys the vessels into many and divers channels to load salt, wood, and other things found on the borders of the sea, is obedient in following the main army of the sea, which has been skirmishing against the earth. In like case, I say that it must needs be that the springs, rivers, and brooks should return with them: and they must needs also be dried up during the absence of the sea, even as the channels are filled by the coming of the tide and dry up in its absence. See now whether your good philosophers have any argument sufficient for the overthrow of mine.

It is a very certain thing, that when the sea has retired, it discloses in many places more than two full leagues of sand, on which we may walk dry-foot; and we must believe that when it is retreating, fishes retreat with it. There are some kinds of shell-fish, as mussels, cockles, oysters, and many kinds which are made in the form of a snail, which do not deign to follow the sea, but trusting in their armour, they that have but one shell fasten themselves to the rocks, and the others, that have two, remain upon the sand. Some kinds of these, which are formed like a knife-blade, being about half a foot long, have taken the precaution to conceal themselves within the sand, and then the fishermen go out to seek for them. It is a wonderful thing,* that the oysters, being brought to a distance of ten or twelve leagues from the sea, perceive the hour in which the returning tide approaches the spot on which they had their abode, and open of themselves to receive aliment from the sea as though it still were near them. And because they have this habit, the crab, knowing well that they will present themselves with open doors when the tide shall return into their neighbourhood, lurks near their habitations, and when the oyster shall have parted its two shells, the said crab, to deceive the oyster, takes a little stone, which it puts between the two shells, in order that they may not close, and this done, he is able to make his repast

* If true.

upon the said oyster.* But the mice have not found out the reason why the oyster has two shells: for it has happened in many places distant from the sea, when the oysters felt the hour of the tide and opened as I have before said, the mice finding them open would come to eat them, and the oyster feeling the pain of the bite would close firmly its shells, and in this way many mice have been taken: for they had not put stones between the two shells, like the crab. As for the large fish, the fishers of Xaintonge have invented a good way of deceiving them: for they have planted upon certain spots in the sea many large, thick poles, and in these they have fixed pulleys to which they attach the cords of their nets, and when the sea has retired, they let their nets lie on the sand, leaving

* Mr. Swainson (on the Habits and Instincts of Animals) refuses to believe this of the ourang-outang, to whom the same device has been for centuries attributed. Of course it is not to be believed of crabs. From very early times there have been natural history fables current in which the oyster, or some bivalve shell-fish, plays the part of hero. What Palissy says in the text concerning mice has been said often of foxes and racoons. In Dr. George Johnstone's Introduction to Conchiology, a book in the right naturalist spirit, full of cheerfulness and unaffected learning, there is reprinted an extract from the *Berwick Advertiser* of Jan. 15, 1848, which shows that the old stories have not yet lost their vitality. Thus runs the narrative:—"The *Inverness Courier* states that immense mussels, some of which are almost as large as a man's shoe, are found at Ardinisgain, on Loch Carron. A few days since, one of these mussels was left uncovered by a spring ebb-tide, and was induced by the rays of the sun to open itself. While thus open it was observed by a prowling fox, which thrust its tongue into the shell in the hope of securing the fish; but the mussel instantly closed on the tongue of the fox, which was retained a prisoner until drowned by the rising tide."

however the cord to which they are attached holding by its two ends to the said pulleys. And when the sea returns the fishes come with it and seek pasture on one side and the other, giving themselves no concern about the nets because they swim above them: and when the fishermen see that the tide is on the point of turning, they raise their nets to the height of the water, and they being attached to the said poles, the bottom of the said nets is held down by several stones and lumps of lead which keep them firm below. The mariners having stretched their nets and raised them in this way, wait until the tide shall have gone down, and as the tide recedes the fishes seek to follow as they are accustomed: but they find themselves deceived inasmuch as the nets stop them, and by this means they are taken by the fishermen after the tide is down.

"And in order not to wander from our purpose, I will give you another illustration. It must be held for a certain fact that the sea is as high in summer as in winter, and if I were to say more I should not speak untruly, because the marshes are highest during the full moon of the month of March and that of the month of July: at which times it covers more lands in the maritime parts of the Xaintonic islands than at any other season. If then it were true that the sources of springs come from the sea, how could they be dried up in summer, since there is not at that time less sea than in the winter? take notice of this proposition, and you will perceive that if the sea nourished

with her teats the fountains of the universe,* they never could be dry in the months of July, August and September, at which times an infinite number of wells become exhausted. I must needs again dispute against you and your Latin philosophers, because you find nothing good if it does not come from the Latins. I tell you for a general and certain rule, that waters never can mount higher than the sources from which they proceed. Do you not know well that there are more fountains on the hills than in the valleys: and even if it were true that the sea is as high as the highest mountain, still it is impossible that fountains on the hills could proceed from the great flood of the sea: and the reason is, because in bringing water from a higher place to make it mount up to another place equally high, it is essential that the channel by which the water passes, should be so well closed that nothing can escape: otherwise the water having descended into the valley never would remount into high places, but would escape by the first hole that it could find. I will therefore at once conclude that if the sea were as high as the mountains, its waters could not arrive at the high parts of the mountains, whence the springs proceed. For the earth is full in many places of holes, cracks and gulfs, by which the water that might flow from the sea would escape into the plain, by the first holes, springs or gulfs it could find, and before it rose to the summit of the mountains all the plains would

* "Si *la mer* alaictoit de ses tetines les fontaines de l'univers." Palissy plays upon a word, perhaps.

be engulfed and covered with water: and that the earth is so pierced, the continual fires which proceed from the abysses bring with them sulphurous vapours that bear testimony, and but one hole would suffice, or a single crack, for the submersion of all the plains."

To the statement that if spring-water came from the sea it would be salt, Theory opposes the general belief that it is purified in passing through the veins of earth. Palissy, on the contrary, replies: "It is much more to be believed that the salt of the sea comes from the earth, having been carried thither as well by the current of rivers which empty themselves therein, as by the impetuous waves which violently strike against the rocks and salt-containing earths. For you should note that in many countries there are rocks of salt. There is some author who has written in his works that there is a country in which the houses are built of blocks of salt; which being considered, you must seek more legitimate arguments if you would have me believe that the waters of springs and rivers proceed from the sea.

"THEORY.—And I pray you then to make me understand your own opinion, and whence you think that they can come if they do not come from the sea.

"PRACTICE.—You must believe firmly that all the waters that are, shall be, and have been, were created in the beginning of the world: And God, wishing to leave nothing in idleness, commands them to go to and fro and be productive. This they do without ceasing, as I have

told you the sea does not cease to go and come. In like manner the rain-water that falls in winter remounts in summer to return again in winter, and the waters and the heating of the sun and the dryness of the winds striking against the earth raises a large quantity of water, which being collected in the air and formed into clouds are sent out to all corners of heaven as the heralds of the Lord. And the winds moving the said vapours, the waters fall again upon all parts of the earth, and when it is God's pleasure that the clouds (which are nothing else than stores of water) shall dissolve, the said vapours are converted into rains which fall upon the earth.

"THEORY.—Verily I find out now that you are a great liar, and if it were true that sea-water could be raised up into the air and fall afterwards upon the earth, it would be salt rain, so there you are caught by your own argument.

"PRACTICE.—That is very badly theorised on your part: do you think to take me by surprise upon this point? You are far out in your reckoning. If you had considered the manner in which common salt is made, you would never have put forward such an argument, and if the truth were as you say, no salt ever could be made. But you must understand that when the salt-makers have put the sea-water into their reservoirs, to cause it to congeal under the influence of the sun and wind, it never would congeal at all were it not that heat and wind raise the sweet water which is mingled with the salted. And when the sweet water has exhaled, the salt residue creams and con-

geals. In that way I prove that the clouds raised from sea-water do not contain salt. For if the sun and wind exhaled the salt-water from the sea, they could also exhale that which is used for salt-making, and then it would become impossible to make salt. There you have your arguments destroyed.

"THEORY.—And what shall become then of the opinion of so many philosophers that springs or rivers are engendered of a thick air, which proceeds from below the mountains, from certain caverns which are in the said mountains, and they say that this air becomes thick and some time afterwards dissolves and changes into water, which causes the source of springs and rivers?

"PRACTICE.—Do you understand fully what you say, that it is an air which thickens against the vaults of caverns, rocks, and that this dissolves into water? Grant that it is so: at any rate it seems to me that the manner of speaking is improper. You say that it is a thickened air, and then that it resolves itself into water. It would then be water similar to that of which I say that it is raised, of which we speak as clouds. * * I do not deny that the waters enclosed in the caverns and abysses of the mountains can exhale against the rocks and vaults which overhang the said abysses: but I deny that this is the whole cause of the origin of springs: it is so far from it, that if you consider how since the creation of the world there have continually proceeded from the said mountains springs, rivers and brooks, you will easily understand that it is impossible

that the said caverns could supply with water for a year, or for a month, as many rivers as flow daily down. * * I do not deny that the watery vapours from the subterranean caverns may contain a large quantity of water: but it must necessarily have been placed and carried thither by the posts and messengers of God, that is to say, the winds, rains, storms and tempests, as it is written that they are the heralds of the justice of God. The waters, then, in caverns have been placed there by the rains engendered as well of waters that have risen from the sea as of those from the earth and from all humid things, in the drying of which their aqueous vapours are raised up on high to fall again. And thus the waters do not cease to ascend and descend; as the sun and the moon have in their action no repose, in like manner the waters never cease to labour in engendering and producing, going and coming as God gave to them commandment."

Palissy, having in the next place pointed out the hard texture of rocks and mountains, by virtue of which they serve as a skeleton under the softer earth, proceeds to the fuller elaboration of his views. They are quite accurate and philosophical; and never did a naturalist—unaffected and clear-sighted as most naturalists are—unfold the results of his observation with more exquisite simplicity.

"Having taken this consideration," Palissy says—he has been speaking of the hardness of the rocks—"into your memory, you can understand the reason why more springs and rivers proceed from the mountains than from the

remainder of the earth; which is no other thing than that the rocks and mountains retain the water from the rains, as they might be held by a brazen vessel. And the said water falling upon the said mountains over the earths and clefts, always descend, and are not stopped until they have found some spot grounded with stone or rock tolerably close-grained or condensed; and then they rest on such a bottom, and having found some channel or other opening, they peep out in fountains or in brooks and rivers according to the nature of the opening to the receptacles: and inasmuch as such a source cannot run contrary to its nature on the mountains, it descends into the valleys. And though the beginnings of the said sources coming from the mountains can scarcely be large, there comes to them aid from all parts, by which they are aggrandised and augmented: and especially from the lands or mountains which are to the right and left of the said sources. * *

"Let us come now to the reason why there are not water-sources in the lowlands and plains as in the mountains. You should understand that if all the earth were sandy, loose or spongy, like the cultivable lands, water-springs would not be found in any place whatever. For the rain-waters falling on the said earths would descend ever lower and lower towards the centre, and could never remain anywhere to make either wells or springs. The reason why water is found whether in wells or springs, is no other than because they have found a floor of stone or

argillaceous earth, which can hold water as well as stone; and if any one seeks water in sandy soils, he will not find it unless there be under the water some clay, stone, slate or mineral, by which the rain-water is stopped upon its passage through the earth. You may tell me that you have seen several springs proceeding out of sandy soils, or even out of sand itself: to which I answer, as above, that there is below some floor of stone, and that if the spring rises higher than the sand, it comes also from a higher ground."

Palissy, having thus demonstrated the cause of springs, is about to pass to the practical application of his knowledge, when he remembers one or two more arguments against the prevailing notion that fountains are supplied by channels from the sea. When the sea retires, he says, the channels emptied of sea are nevertheless not empty: they contain air. If, then, the channels be perfectly closed, how is the air to escape before the sea on its return, since the sea cannot pass in unless air passes out? "I have another singular illustration," he adds, "and it shall be the last on this head, which is, that in the districts and islands of Xaintonge bordering the sea, there are sundry small towns and villages with both sweet and salt wells; one may see clearly thereby that the wells of which the water is salt are supplied by the sea, and the wells of sweet water which are near the salt wells and also near the sea, are supplied by the runnings of the rain that come from inland parts. And what is more, and well to be noted,

there are sundry little islands environed and surrounded by the water of the sea, even some of them do not contain an acre of dry land, in which there exist wells of sweet water; this makes it certain that such wells have not their course on the spot nor from the sea; but from the flow of the rains traversing the earth until they have found a bottom, as I have already said."*

The rest of the essay Palissy devotes to practical ideas; there occur, however, in the course of it two more philosophical suggestions. The difference in the size of springs he accounts for by the different distance which the waters may have flowed underground before they found an outlet, and by the greater or less extent of surface from which they

* The following passage from "Purchas his Pilgrimage" (1617), chap. xiii., § 3, further illustrates the opinions held in and after the time of Palissy on "the Originall of Fountaines; which both Scripture and reason, finding no other store sufficient, deriue from the sea, how they are from thence conueyed by secret channels and concauities vnder the earth, and by what workemen of Nature thus wrought into new and fresh waters. *Scaliger's* experiment to proue the sea-water at the bottome fresh, by bottles filled there by cunning diuers or otherwise, is by *Patritius* his experience, as he saith, found false. And this freshnesse of the springs, notwithstanding their salt originall from the sea, may rather be ascribed to percolation and strayning through the narrow spungie passages of the earth, which makes them leaue behinde (as an exacted toll) their colour, thicknesse and saltnesse. Now how it should come to passe that they should spring out of the earth, being higher than the sea, yea, out of the highest mountaines, hath exercised the wits of phylosophers; some ascribing it to a sucking qualitie of the thirstie or spungie earth, some to the weight of the earth pressing and forcing the waters vpwards, some to the motion of the sea continually (as in a pumpe) thursting forwards water * * * And Mr. *Lidyate*, in a Treatise of the Originall of Springs, attributeth the same to under-earth fires."

have received the drainage. The continuance of springs during the dry weather he explains by pointing out that the process of percolation through the earth is very gradual, and that the supply of one rainy season can thus set in before the supply left by the last season is quite exhausted.

On the subject of artificial fountains the doctrines of Palissy are in the highest degree ingenious. They are founded on a strict imitation of the ways of nature. The landlord who has on his estate a rock or mountain, should regulate its drainage by stopping up with masonry all crannies and wild outlets for the water, aiding here and there with a few artificial channels, and so managing that the rain passing through the surface-soil should all drain downward to one point at the base of the mountain. In order that the flow of water may not be impetuous or destructive in a time of heavy rain, Bernard suggests that its course through all larger channels should be obstructed by great stones, and that, as further barrier, as well as by way of profitable investment, trees should be planted over the whole mountain-side, and plants encouraged to grow under their shade. The water, collected at the base of the hill in a large reservoir, is to filtrate through a bed of sand into a second reservoir, and into a third if convenient, which will be the fountain, and which may be decorated at pleasure. The water is to be drawn by a tap, and a second tap over a small receptacle is to supply pure water when it is needed for the use of cattle. When the house is

somewhat far from the gathering-ground, the water is to be brought from the reservoir in pipes.

On level ground, where there is no mountain, each land-owner is taught how to make a gathering-ground for his own private use. Selecting a field, he is to give a slope to it of about four feet, by carrying the earth from one end to the other. He is then to pave his sloping field with stone, or slate, or clay, and at the bottom of it make his reservoir. But there is no need that he should make no other use of his gathering-ground. Having established the impervious base, planting trees in it, and leaving a little room around their stems, he may cover it with cultivable soil, and plant a field through which the rains will percolate, and under which they may run slowly down into the reservoir. From the reservoir, through a sand-filter to the fountain, the water will pass as in the other case.

In districts where there is no stone, nor clay, the inclined field may be made of beaten earth turfed over, and shaded from the sun by surrounding trees. The network of grass-roots will form a floor, and the rain-water will run down such a slope, towards the artificial fountain.

Theory objects to Bernard that his reservoirs for surface-drainage are mere cisterns. Palissy replies, that they have a fair right to be called natural springs, because they are formed in the same way. "I have said to you that they resemble natural fountains in all points but two; the first is, as I have said, that nature is assisted: just as sowing

corn, training and cutting vines is aid to nature: the second is of great weight and cannot be understood unless you have in mind the former part of my discourse, and having understood that properly, you will be able to judge by the proofs I have alleged that none of the natural fountains can produce water of the good quality of which you can be so assured as of the quality of that which I have taught you how to make." The reason is, as you may have seen, that the whole earth is full of different kinds of earths and minerals, and that it is impossible that water passing by the conduits of the rocks and veins of the earth should not bring with it some salt or hurtful mineral, which cannot happen with the fountain of which I have instructed you. Then you know well that it is a general rule that the lightest waters are the best: I ask you is there water lighter than that of the rains? I have told you already how they have risen before they descended, and that happened through the power of a warm exhalation: now the waters which have risen can contain in themselves but little earthy substance and still less of mineral. And this water which has so lightly ascended by exhalation, descends again upon ground which you know well to be free from mineral or hurtful matter." If, therefore, says Palissy, any difference in name is to distinguish his fountains from those which flow without assistance, he would call those Wild fountains, just as fruit-trees which grow naturally in the woods are called wild: and being transplanted are softened and improved for use. And if you would understand better that

rain-waters are the lightest, and in consequence the best, question a little the dyers and the sugar-refiners, they will tell you that the rain-water is best for their business and for many other things."

The practical principles taught by the shrewd Potter in this treatise, are precisely those in which sanitary writers are at this day busily endeavouring to instruct the public. The system of surface-drainage taught by Master Bernard has been applied among us only during the last few years, and is slowly coming to be regarded as the best means of providing for the water-supply of all large towns. The opinions recorded in 1580 by Master Bernard of the Tuileries, find a complete echo nearly three hundred years afterwards in the report of the General Board of Health on the supply of water to the metropolis, issued in 1850. Our Board of Health is not less decided in its censure of well-water, than Bernard Palissy was in his own day. The board, after pointing out, as Palissy had pointed out, the admixture of foul matter with the wells of towns, tells us that "deep well-water is free from these surface animal and vegetable impurities, but it has generally more of mineral impurity"* (so taught Bernard), "and is usually unattainable in sufficient quantity at a moderate expense." In Bernard's time that last objection had especial force,

* "Instinct or experience," says Mr. Youatt, whom the report of the Board of Health quotes gladly, "has made the horse himself conscious of this, for he will never drink hard water if he has access to soft; he will leave the most transparent water of the well for a river, although the water may be turbid, and even for the muddiest pool."

and was dwelt upon by the Potter, as we have seen, with ample emphasis. The board gives copious evidence which it declares to be "conclusive in favour of the adoption of the principle of soft water supply by means of gathering-grounds." The idea of its gathering-grounds it adopts from "the new practice in Lancashire," and the new practice in Lancashire is, in effect, that which Bernard taught two hundred and seventy years ago. "The new practice in Lancashire has been," the board informs us, "to take some elevated ground, generally sterile moor-land or sand heath; and to run a catch-water trench or conduit round the hill, midway, or as high up as may be convenient for the sake of fall, regard being had to the space of the gathering-ground. An embankment is thrown across some natural gorge, at the nearest point at which a reservoir may be formed without the expense of excavation. Into this the rain-water is led and stored, having in many instances been previously filtered."

The Lancashire men, on the point of water-supply, are not in advance of the self-educated Potter. The secrets he had gathered from devout communion with nature, Bernard did not hide. He told them as he could; he called the learned men about him in his cabinet, and placed his self-taught knowledge freely before them; he wrote it down plainly in his mother tongue and printed it, and scattered it in print. He declared himself ready to be visited in his own house and answer questions, or give more abundant explanations of his doctrines to any

man by whom they were desired. To the utmost limit of his energies, and they were great, by ordinary and by extraordinary means, the humble artisan endeavoured to diffuse his knowledge. His efforts were unsuccessful. France in that miserable age could not attend to science, and they who praised the ingenuity of Master Bernard of the Tuileries, were most concerned to wonder that it should be displayed by a man ignorant of Greek and Latin. There would have been a hearing for the naturalist out of France if he could only have spoken to the world in what was then the universal tongue of science; he would have won also more respect in his own country. But Bernard could write only in his mother tongue words whose extreme simplicity and ease discredited his claim to rank as a philosopher. So, were an eagle to be nested among owls, the owls might look upon him as a clever though eccentric bird; but they would pity him for wanting gravity of aspect, and censure his perverted taste for flying out into the daylight.

CHAPTER IX.

DOCTRINES OF PALISSY: ALCHEMY AND THE ORIGIN OF METALS.

BROUAGE, a small town, with a harbour, is situated on the coast among the marshes of Saintonge. It was built upon ground rescued from the sea by Jacques, a Sire de Pons, under the reigns of Charles VII. and Louis XI. The town having been fortified by this Jacques, was named after him Jacqueville or Jacopolis, soon afterwards corrupted into Jaques Pauly. It was a prosperous salt-marsh district, and the name Brouage indicates its nature, being taken from a Celtic word, "brou," meaning marshy soil. The town of Brouage, not far from the old home of Palissy, in Saintes, had undergone two sieges during the civil wars: the last in the year 1570. Saintes also had been besieged, and the whole district of Saintonge was trampled down repeatedly by combatants. The town of Brouage, when besieged, had suffered much from want of water. Remembering this fact, and being most familiar with the district,

Palissy adds to his essay upon waters and fountains an "Advertisement to the Governor and Inhabitants of Jaques Pauly, otherwise named Brouage," to explain to them that the situation of their town is suitable for the supply of their want by surface-drainage, at a very small expense.

Having completed the statement of his Theory of Springs, and the application of his theory to practice, Palissy devotes a page or two to a short essay—always, of course, using the form of dialogue—upon the bore in the Dordogne. If it were caused by the opposition of the tide, he does not see why it should take place only at one time in the year, and why it should not take place in the Garonne also, since both rivers flow into the same estuary. These questions he had pondered on the Bec d'Ambez, the narrow point of land between the confluence of the two rivers; and he endeavours to explain a difficulty that was in his day perfectly inexplicable, by the suggestion of an ingenious idea. This little essay contains, also, a notice of the stormy passage of Maumusson among the islands of Saintonge, named by Rabelais among the most dangerous spots on the French coast. Here, also, Palissy had looked on thoughtfully, and taught himself how waves are lifted by the friction of the wind.

After briefly noticing these matters, the venerable Potter bends his white hairs over the paper, and prepares his pen for a more delicate investigation. A bold attack on alchemy in France, during the sixteenth century, could not fail to give a great deal of offence, since alchemy was prac-

tised by physicians, nobles, even kings. Bernard was not likely to speak otherwise than boldly, but he was not willing to offend an entire class of men, which included many of his patrons and familiar friends. The treatise upon alchemy and metals is preceded, therefore, by this notice "To the Reader," which is set up by way of lightning-conductor, to divert whatever flashes of wrath his work might otherwise bring down upon his head.

"Friend reader, the great number of my days and the diversity of men has made me acquainted with the divers affections and opinions more than can be named existing in the universe: among which I have found the opinion of the multiplication, generation and augmentation of metals, more inveterate in the brains of many men than any of the other opinions. And because I know that many seek for the said knowledge without a thought of fraud or malice, but because of an assurance they have that the thing is possible: that causes me to protest by this writing that I do not at all propose to blame three kinds of persons. That is to say, the nobles who occupy their minds, by way of recreation, and without being incited by a desire of unlawful gain. The second are all kinds of physicians, who desire to understand the ways of nature. The third are they who have the means, and who believe the thing to be possible, and would not on any account make evil use of it. And because I have undertaken to speak against thousands of others who are unworthy of such knowledge, and totally incapable, on account of their

ignorance and slight experience. Also because they have not the means of supporting the losses which ensue, they are constrained to cheat with external dyes and sophistications of the metals. For these reasons I have undertaken to speak boldly, with invincible proofs, I say invincible to those of whom I speak, and if there be any one who may have effected so much by his labour that he has moved the charity of God to reveal to him such a secret, I do not mean to speak of such persons: But on the contrary, inasmuch as the capacity of my own mind cannot fit itself to the belief that such a thing is possible, when I shall see the contrary, and truth shall vanquish me, I will confess that there are no people more hostile to science than the ignorant, among whom I shall not be at all ashamed to place myself in the first rank, in as far as concerns the generation of metals. And if there be any one to whom God may have distributed this gift, let him excuse my ignorance: for according to that which I believe I am about to put my hand to my pen, to pursue that which I think, or to express it better, that which I have learned with very great labour, and not in a few days, nor in the reading of a set of books: but in anatomising the womb of the earth, as may be seen by the discourse which follows."

It will be seen that Bernard took much pains in writing this apologetic note, and that his remodelled sentences are here and there left incomplete. The Potter, though his genius spreads a great charm over his writing, was pro-

bably not ready with his pen; he says of himself, in this treatise on Alchemy, that he "could write neither Latin nor Greek, and scarcely French." The consciousness of technical defects, and the necessity of labouring for that union of extreme clearness and brevity essential to the fit communication of his philosophic views in print—before the invention of book-making—caused Palissy to take great pains over his composition. We know that he did this, because by some accident the printer received duplicate sheets of manuscript belonging to one portion of the treatise upon Alchemy. Of these sheets one was a corrected version of the other; and Palissy appears not to have detected in good time that the printer had used them both, one in its proper place, the other tacked to the conclusion of the treatise. A comparison of these two pieces shows how carefully the Potter laboured to overcome what he regarded as the drawback of his "rustic style."

Once engaged upon his subject, Palissy, of course, proceeds to speak his mind without reserve; his only care is to speak clearly. His treatise is upon Metals and Alchemy. He suggests modestly his own theory of the formation of metals; for of the generation, augmentation, and congelation of metals, to which alchemists pretend, he says, "it is a work done by the command of God, invisibly and of a nature so very occult that it was never given to a man to know it." Against alchemy the Potter uses all the power of his reason.

In regarding Bernard as a chemist, we must of course remember that the main truths of chemistry began to bud in our own century, and that in the time of Palissy the seed from which they were to come was scarcely planted in the minds of the philosophers. Palissy did not decry alchemy in its decline. In 1681, exactly a century after the publication of Palissy's discourses, Beccher* wrote of chemists as a strange class of mortals, impelled by an almost insane impulse to seek their pleasure among smoke and vapour, soot and flame, poisons and poverty. "Yet among these evils," he says, "I seem to myself to live so sweetly, that may I die if I would change places with the Persian king. My kingdom is not of this world. I trust that I have got hold of my pitcher by the right handle—the true method of treating this study. For the pseudo-chemists seek gold; but I have the true philosophy, science which is more precious than any gold." So Beccher was proud to write a hundred years after the time of Palissy; and when we remember that the Phlogistic Theory—a false but serviceable notion—was not propounded until that time, having, indeed, Beccher and Stahl for its establishers, we must not expect more than shrewd perceptions in the best chemical theory that could have been propounded by the wit of man in the year 1580. The simple doctrine of the opposition between alkali and acid was not at that time known. It was first

* In the *Physica Subterranea*. Preface to the Reader.

taught by Francis de la Boe (Sylvius), who was born, thirty-four years afterwards, in Amsterdam.

Chemists, in the time of Palissy, supposed that there were four elements, and three principles, salt, sulphur, and mercury. Of sulphur and mercury were made the metals. This theory of the origin of metals Palissy disproved. It should be well remembered that the origin of metals is at this day unknown to chemists; they have not yet been decomposed; and we escape from our difficulty by saying that each metal is an element in itself, though we more than suspect that this also is a theory that better knowledge will explode. Until our own great chemist, Faraday, in very recent years, gave definite direction to our thoughts by pointing out the relation that subsists between ore-producing veins and the magnetic currents in the earth, we had no light to aid us in discovering the origin of metals. We say that they were made in the beginning, and accordingly will be found in the end; so said the philosophers in Bernard's time of rocks. So said Palissy of nothing. In his scheme of philosophy the universe is never idle; animal, plant, and mineral, alike are working always to fulfil the benevolent designs of God. He knows no idle substance in creation.

In endeavouring to account for the formation of metals, he observes, in the first place, that when pure, they are found deposited in a crystalline form. After many years' reflection on the origin of crystals, Bernard tells us how, "one day somebody showed me some tin ore that was

thus formed in points, another time there was shown to me silver ore still cleaving to the rock, in which the substance of the said silver had been congealed, which ore was also formed in diamond points. When I had considered all such things I understood that all stones and kinds of salt, marcassites and other minerals, of which the congelation takes place in water, contain in themselves some form whether triangular, quadrangular, or pentagon, and the side which is in the earth and against the rock cannot have any form but that of the surface on which it reposes at the time of congelation."

Palissy was acquainted, from observation, with the mode in which substances were slowly deposited from water in the crystalline form. He was aware of the contained water of crystallisation, "the crystalline water which has some affinity with the generative water presently to be spoken of." Palissy shows, throughout, a knowledge of the fact, that crystals of the same substance are constant in their form, although this fact was not recognised in science before the year 1669, and crystallography was unknown as a science upon which reasoning was to be founded until the time of Haüy, in 1780, two centuries after the publishing of Bernard's book. Palissy ascribes, in several places, the formation of crystal to the tendency existing among homogeneous particles to come together and cohere. "I know well," he says, with a glance forward into unknown regions of chemistry, "that these things have some power of attracting one another, as the loadstone attracts iron.

Also I know well that sometimes I have taken a stone of fusible matter, that after I had pounded and ground it as fine as smoke, and having thus pulverised it I mingled it with clay, some days afterwards when I was about to labour on the said clay, I found that the said stone had begun to collect itself again, although it was so subtly mingled with the clay, that no man could have found a stone so big as the little atoms that we see upon the sunbeams entering a chamber, a thing at which I marvellously admired. That will induce you to believe that the matter of the metals collects and congeals wonderfully, according to the order and the wondrous power which God has ordained."

Crystals, then, being deposited in water, and containing water, native metals being at the same time deposited in a crystalline form, Palissy considered that he could not err in considering all metals to have been deposited from water. He confirmed his opinion to the hearers in his cabinet, by producing wood impregnated with metal, and shells that likewise have assumed metallic form, "of which shells" he says, "I have seen some quantity in the cabinet of Monsieur de Roisi.* For my part I have one which I showed to the master-mason of the fortifications of Brest, in Lower Brittany, who attested to me that there were many like it to be found in that country. In the cabinet of M.

* Henry of Mesmes (Diocese Bazas), Chevalier Seigneur de Roissy, was Councillor of State, Chancellor to the King of Navarre in 1572, and superintendent of the house of the Queen of France in 1580.

Race,* a famous surgeon of this town of Paris, there is a stone of metallic ore, in which there was a fish of the same substance. In the region of Mansfeld are found a great number of fishes reduced into metal." Another piece of tangible evidence produced by Bernard at his lectures, was a lump of slate in which there was contained a metallic crystal, slate itself being evidently a subaqueous deposit. He cites also, in support of his opinion, the fact of water being found abundantly in mines. "One day Antony, King of Navarre, commanded to pursue the vein of some silver mines that had been found in the Pyrenees. But when a small quantity of ore had been extracted, the waters that were found compelled the overseers of the mines to abandon all. And you know well that many mines have been abandoned for that reason."

Having determined, then, that metals were deposited from water, in which no man ever saw them in nature visibly suspended, Palissy laboured to discover how this deposit could take place. He solved his difficulty by the suggestion of another element. "Since the crystals," he says, "form in the midst of common waters, refusing to have affinity with them in their congelation, any more than fat, oils, and other matters that will separate themselves

* Monsieur Race was Nicolas Rasse des Nœux, surgeon to the king, who died in Paris, 1581. He left a MS. collection of pieces in verse and prose, relating to the political events of his time, and an extensive library, chiefly consisting of old Gothic romances. Some curious old books, with his name upon them, are dispersed among the chief libraries of Europe.

from the common water: we must conclude, then, that the water of which the crystal is formed, is of a kind different to common water; and if it be of a different kind, we must assure ourselves that there are two waters, the one exhalative, the other essensive, congelative, and generative, which two waters are intermingled one with another in such a manner that it is impossible to distinguish them, until one of the two has been congealed."

Having defined the affinity which unites bodies different in kind, and the attraction which is a "supreme power that draws together things of the same nature"—having pointed out some of the first principles of crystallography, Palissy proceeds to account for various phenomena by means of his fifth element, the water of crystallization, the germinative or congelative as opposed to the exhalative or common water. This matter, flowing occult with every stream, contains the germs of scents, flavours, and divers properties of things afterwards to be developed. In the seed, says Palissy, are the germ of future leaves and branches, colours, odours, and fixed shapes of leaf and flower, all which things it draws out of the earth; not more wonderful, says Bernard, is his fifth element—the congelative water, which he supposes to be the germ of minerals and salts. This water, that is to be obtained also from crystals, is obtained from straw and vegetative matter; it is this which enters into the composition of animal bodies, which are full of fluid, and were born in fluid, to increase their substance.

Against the objection that the manner of this action is incomprehensible, Palissy adduces other wonders equally beyond comprehension and yet true. For example, he says, "I have seen at the time when glass-painters were in great request, because they painted figures in the windows of the temples, that they who painted the said figures did not venture to eat garlic or onions; for if they had eaten any, the painting would not hold upon the glass. I knew one of them named Jean de Connet, because he had an offensive breath, all the painting that he made upon glass would in no way be made to hold firm, although he was accomplished in his art." Again, "I have seen a woman modest, wise and honourable, who when her husband was in the country felt by some secret movement the day on which her husband would return."*

Against the alchemists Palissy objects that it is an error to attempt the formation of that by fire which nature forms by water. He bids them pound an acorn and by art attempt to rebuild it, or pound radiant shells and mould them again into a glorious cup of the like lustre. Such things are less difficult than to create gold.

* In the library of St. Germain des Prez there are some MS. extracts from the works of Palissy, by a contemporary student, who adds to this passage the following statement from his own experience: "The wife of Master Jean de la Moltrète, named Master Jean de Rochnions, living at the said place in Carry, assured all the people of her house, one morning at the end of May, 1582, that I should arrive that evening, which proved to be true, I returning from Lyons, on which journey I had been away nearly two months. Such movements, I say, belong not only to human and brute creatures, but also to the vegetative and metallic."

In speaking of shells rainbow-hued, Palissy shows that he did not, like his contemporaries, look upon the rainbow as a simple wonder in the sky. "I considered," he says, "that the cause of the rainbow could only be that the sun-light passed directly across the rains that are opposite the sun: for one never saw a rainbow to which the sun was not opposite; also one never saw a rainbow through which the rain was not falling."

The arguments of Palissy against the alchemists it is not necessary in the present day to reproduce. Of the absurdity of the belief that by the philosopher's stone gold could be multiplied a hundred-fold, Bernard had an extremely keen perception. To the assertion of his antagonist, that he had with his own hand, under the direction of an alchemist, doubled a piece of silver money, Palissy answers with the exposition of a common fraud. A second piece of metal had been fastened by wax to the end of the rod with which the cauldron had been stirred, and the wax melting, had left the silver at the bottom of the pot. Other frauds Bernard exposes, and especially dwells upon the large quantity of bad money that had been put into circulation by men who carried on the business of coiners under the cloak of alchemy. "There was a false coiner (of Béarn) taken in the diocese of Xaintonge, on whom were found four hundred counters ready to be marked, no jeweller or other man would have supposed their metal to be bad. For they answered like good coin to the hammer and the flame, were right in touch and

tone. But when they were tested the fraud was discovered. At that time there was a provost at Xaintes, named Grimaut, who assured me that in proceeding against a coiner the same gave him the names and surnames of a hundred and sixty men, who were his fellow-tradesmen, together with their ages, qualities and abodes and other certain marks of recognition. And when I inquired of the said provost why he did not cause the apprehension of the said coiners named upon his list, he replied to me that he dared not undertake it: because there were in their number many judges and magistrates, as well of the Bordelois and Perigord as of Limousin: and that if he had ventured to annoy them, they would have found means to put him to death."

Of the facility and skill with which delusions might be practised, Palissy gives this illustration: "The Sieur de Courlange, valet-de-chambre to the king, knew many such artifices, if he had cared to use them. For one day happening to discuss these things before King Charles the Ninth, he boasted by way of jest, that he would teach him to make gold and silver, to experiment upon which matter he commanded the said Courlange to prepare for the work promptly: this was done, and on the day of trial the said De Courlange brought two phials full of water, clear as spring-water, which was so well prepared that on putting a needle or other piece of iron to steep in one of the said phials it became suddenly of the colour of gold, and the iron being steeped in the other phial became

of the colour of silver: then quicksilver was put into the said phials, which suddenly congealed: that of one of the phials taking a golden colour, that of the other being like to silver: of which the king took the two lumps and went boasting to his mother that he had learned how to make gold and silver. And all the while this was a deception, as the said De Courlange has told me with his own mouth."

Palissy tells also of the devices by which alchemists endeavoured to hatch gold, by exposing their materials to a slow, continued heat, resembling that of incubation. Some placed the fire at a distance from their would-be golden eggs, and conducted the heat through a flue with many doors, by which to regulate the temperature. Others used the heat of a lamp, with a wick perpetually equal, and hoped that in the end this would produce the attainment of their object. "I say," Bernard tells us, "that some have waited many years,—witness the magnificent Maigret,* a learned man of great experience in these matters, who nevertheless being unable to come by his desire, boasted that if the wars had not put out his lamp before the time he should have found the alcahest."

As a last illustration of the views of Palissy upon the subject of alchemy, we may refer to his opinion on the

* Louis Maigret had translated Greek and Latin authors, and composed systematic works upon French grammar. He had also edited a series of engravings from Albert Durer. Palissy may perhaps call him magnificent because he was a pompous personage. He speaks of him in another treatise with the same epithet.

subject of the advantage to be derived even if five or six Frenchmen really did discover the philosopher's stone. "I have been told," urges Theory, "by several alchemists, that if they could succeed they would make gold enough for"—a good sixteenth-century ideal of the use of a great deal of gold—"for carrying on the war against all adversaries and even against the Turks."

Palissy replies to this, "I tell you on the contrary that we had better have in France a plague, a war and a famine, than six men who could make gold in such abundance as you say. For after all had been assured that it was possible to make it, everybody would despise the cultivation of the earth, and would study to find out how to make gold, and in this way the whole land would be left fallow, and all the forests of France would not supply the alchemists with charcoal for six years. They who have studied histories say that a king having found some gold mines in his kingdom, employed the chief part of his subjects in extracting and refining the said metal, which caused the lands to remain fallow, and famine to arise in his dominions. But the queen (as being prudent and moved with charity towards her subjects) caused to be made secretly capons, pullets, pigeons and other viands of pure gold, and when the king would dine, she caused these viands to be served, whereat he was glad, not understanding the point at which the queen was aiming: but seeing that no other food was brought to him he began to lose his temper, seeing which the queen supplicated him

to consider that gold was not meat, and that he would do better to employ his subjects in the cultivation of the ground than in the search for gold. If you are not convinced by so good an example, consider within yourself and be assured that if there were, as you say, six men in France who knew how to make gold, they would make so large a quantity thereof that the least of them would wish to establish himself as a monarch, and they would wage war with each other, and after the secret had been divulged, so much gold would be made that none would be willing to give in exchange for it bread or wine."

CHAPTER X.

DOCTRINES OF PALISSY; THE ROCKS AND FIELDS.

POTABLE gold has already been referred to in these pages; a small treatise pointing out its useless character as medicine follows the treatise upon alchemy and metals. The belief in this preparation, almost universal in the time of Palissy, did not die out very rapidly. The potable gold of Mademoiselle Grimaldi has not long been out of use in Paris, and a receipt for making potable gold was still contained in the dispensatory of the Paris Faculty of Medicine two centuries after the delivery of Bernard's lectures.

From potable gold Bernard passes on to mithridate, the enlarged version of a receipt supposed to have been found by Pompey in the tent of Mithridates. There was a supposed antidote to poison (perhaps used really as an antidote against malaria), composed of salt, figs, almonds, nuts, and rue-leaves; and there was also a formidable prescription, including fifty-four items. This prescription was enlarged afterwards, on the occasion of a plague, to

a conspiracy against the stomach of some three hundred drugs, invented by a council of physicians. Against this absurdity, and the whole practice of making long prescriptions, buttressed as it was by the confidence of the profession, Palissy battered arguments, and with the arguments he brought, as usual, into the field a light troop of apt illustrations, well equipped and furnished by his ready wit. The scent of a bouquet containing many fragrant flowers is inferior, he says, in delicacy to the fragrance of a single blossom; the meat of capons, pigeons, partridges, pounded together, would not have so good a flavour as the meat of one of them alone; azure, vermilion, green, and other colours, rubbed into a mass, yield an unsightly compound; so also many properties of medicine combined into a lump yield a result which cannot be foretold, and will be of less value to the physician than a medicine containing only one or two ingredients judiciously selected.

A dispute which Palissy had maintained with some learned friends, one winter's day, while standing by the Seine, opposite his workshop, next occurs to his mind, and suggests a brief essay. Its subject is the formation of ice, and Palissy maintains by argument that it is formed on the surface of the water, and that it does not, according to a common belief, form under water and ascend. The question remained subject to debate even in the beginning of the nineteenth century. The essays on salts and on common salt, which follow next, have been sufficiently referred to in a former part of this biography. The next

dialogue, one of the most important of the whole, is that upon stones. Between this and the elaborate treatise upon marl, with which the book concludes, are an essay upon clays, and the account of his struggles as a potter, of which use has been made in the biography, and which will be found complete at the conclusion of these volumes. The dialogues upon stones and marl, detailing the latest views of Palissy on many points connected with geology and vegetable physiology—the best expression of his knowledge gained among the rocks and fields—are all, therefore, that now remain to be considered before we close our survey of his doctrines.

Let us first understand the position of geologic science in the time of Palissy. Its first principles will be found laid down in his treatise upon stones; elsewhere, they appear scarcely to have been suspected. The earth, it was supposed, had been made in the beginning, and there was little to learn by studying its structure. Fossil marine shells, on mountains and elsewhere, were certainly extremely curious—formed, probably, by a sportive plastic influence descending from the stars, or by a formative power in the body of the earth; certainly not relics of animals, but imitations of them, sports of nature. The strong arm of the Church held back all bold suggestion, that might be supposed by short-sighted ecclesiastics to throw doubt on the authority of Moses. The hills which skirt the range of the Apennines are very full of fossils, and protested strongly against the old plastic doctrine to the eyes of

sensible observers. The authority of this doctrine was therefore openly questioned by individuals in Italy from time to time, before a doubt had suggested itself to naturalists in any other country. The painter Leonardo da Vinci, who died in 1519, was the first who is known to have asserted that the petrified shells had contained living animals.* "They tells us," he writes—"they tell us that these shells were formed in the hills by the influence of the stars; but I ask where in the hills are the stars now forming shells of distinct ages and species?"

Fracastoro, on the occasion of excavations at Verona, in 1517, exposed the absurdity of the theory of plastic force, and said that the Mosaic deluge was too transient to be the cause of so peculiar a dispersion of the shells. Andrea Mattioli, on the other hand, was less clear-sighted, and called the petrifactions, fatty matter fermented by heat.

Falloppio, of Padua, considered them to be generated by fermentation, or a tumultuous movement of terrestrial exhalations. He was a professor of anatomy, but he believed the tusks of elephants found in the soil to be mere earthy concretions, and even regarded buried vases as fortuitous impressions in the soil.

Mercati, who described, a few years before the publication of Bernard's book, fossils preserved in the Vatican by Sixtus V., called them stones shaped by the influence

* This interesting fact was, I believe, first made public by Sir Charles Lyell, in his *Principles of Geology*, from MS. letters of the painter.

of heavenly bodies. He, however, who makes a catalogue for a popo, must needs abide by the scientific opinions of the Church. Many men of science had at that time adopted the opinion of Cardan, and these opinions had spread even into France. Cardan, however, was behind Fracastoro in his views, for while he considered fossil shells to be the remains of living animals, he ascribed their dispersion to the Mosaic deluge.

In France, during the latter days of Palissy, the Church, the ignorant mass, and the bigoted in science, looked upon fossils in the old way, as sports of nature; the more enlightened followed the opinion of Cardan: against both Palissy contested. But the opinions even of Cardan were suspected by the orthodox; and Palissy, passing beyond them to more enlarged views, was the first man, as Fontenelle declared, a century and a half after his death, in the French Academy—"the first who dared openly assert in Paris that fossil remains of testacea and fish had once belonged to marine animals."

Hieronimo Cardan, whose opinion that the position of fossils is due to the Mosaic deluge Palissy justly controverts, was a very able Milanese philosopher, who wrote upon judicial astrology, physics, and morals. He is said to have starved himself, in the same year in which Bernard's book was published, in order to fulfil a prediction that he should die at the age of seventy-five. He did die at that age, in the year 1580, but the legend of his suicide is probably an error. He was a man of quick wit and warm

blood, as he notifies to the world by publishing among his works, instead of whispering to the Church, his confession.*

* Cardan must have published the worst of himself in this account of his life, for he had reason to take pleasure in alarming the respectabilities of his own day. He owed nothing to respectability. An illegitimate son, he spent his youth as servant to a father who was little else to him but a cold master. When his genius had forced him at last up to the means of gratifying his desire for study, he was twice refused his doctor's degree, upon the ground of bastardy:—though learned, he was not respectable. Through the pleading of good friends, his degree was at last obtained; but his first years of manhood, like the first eight years of his childhood, were darkened by the shadow of impending death. After being homeless and friendless, while he was at the same time desperately sick, Cardan at last settled in Milan (often, however, unsettling himself), and made his way as a physician. He owed nothing to the world, and conscious of his intellectual rank, he scorned the cant which would have excluded him, for his birth's sake, from the profession he had chosen. He knew the private characters of nearly all the men who dressed so carefully, and had so much of their own goodness to display before the world. It pleased him to tell the solemn hypocrites, "I have done this, and this, and this; I have gambled and done many a wild thing; and so I am not one of you, who are all honourable men." In society, it pleased him to take up what were accounted the perversest arguments. He was careless about dress, and bold enough to walk about, varying his pace according to his humour, forgetting entirely all that measured steadiness of gait in which respectability delights. The result was a general opinion that he was partly mad; in some respects too clever for a man, in some too silly for a child. A second sketch of his own life is given briefly by Cardan, in the course of his three books on Consolation, whereby he shows that he himself had need to be consoled. His pithy style and aptitude in illustration may be displayed, together with the cast of his philosophy, in a few lines from this work: "A man is nothing but his mind; if that be out of order, all's amiss; and if that be well, all the rest is at ease. I remember a certain rich man, falling mad, snatch'd up a straw, and complain'd he should die for hunger, because there was no corn within the empty ears." (I quote from an old English translation—*Cardan, his three books of Consolation English'd—Of great use in these times. London*, 1683.)

Palissy then stood equally opposed to the geology of the Church and the geology of Jerome Cardan. To understand the position of the Potter's doctrines in the history of science, we must remind ourselves again of the state of knowledge long after his death. When Steno the Dane wrote, in 1669, on solids within solids, the belief still continued to be prevalent that fossils were not animal or vegetable remains. A hundred years after the time of Palissy, the most extravagant notions on the subject of petrifactions are broached in our own philosophical transactions. There is no want of faith here in their animal origin, but the faith wants measure. Reference is gravely made to "Helmont *de Lithiasi*, where, among other Remarques, is recited the Testimony of a Petrified Child seen at Paris, and by the Owner used for a Whetstone," and to other things "perhaps not well enough attested by Authors, of the stupendious Petrifactions of whole Companies of Men and Troops of Cattle, by Aventinus, by Purchas in his Pilgrimage, and (of a troop of Spanish Horsemen) by Jos. Acosta."*

Palissy was too shrewd a philosopher to manifest credulity. In speaking of the cause of petrifaction, he says guardedly, as for the petrifaction "of man, I have never seen it; but I have the good testimony of a respectable

* There is also cited "Deusingius's Historia Infantis in Abdomine inventi et in duritiem lapideam conversi." Heppel and Kirker talked of a town in Africa petrified with all its inhabitants, and Vanhelmont went so far as to record the petrifaction of a troop of Tartars, cattle and all, by the blowing of a certain wind.

physician, who tells me that he has seen, in a gentleman's cabinet, the foot of a man petrified. One Monsieur Salles, living in Paris, has assured me that there is a German prince who has in his cabinet the body of a man in great part petrified." He leaves these facts as he has heard them, and goes on to say that it is quite possible that if a man were buried where his body could become impregnated with stony matter, in the proper way, such petrifaction would take place.

The way in which petrifaction takes place, as described by Bernard, is correct enough; explanations of the process in the language of our own day differ in little but in language, and scarcely show more knowledge than Palissy possessed. The fifth element, congelative water, or, as Bernard often calls it, salt, is of course a prime agent in the process. Let us distinctly understand what Bernard means by his fifth element. When common salt, sugar, saltpetre, and many other substances, are mixed with a fit quantity of water, they dissolve. They disappear entirely. It they were merely held in suspension, they would be visible in little particles throughout the fluid; but by dissolving, they have entered into a relation with the water, much more wonderful than our familiarity with the phenomenon would often suffer us to think it. A glass of water thus containing matter in solution, which has not affected its colour or fluidity, is to the eye water in every drop. Well-water, which contains a large quantity of lime, is clear, fluid, and sparkling. The lime is in the water in a fluid form, and not distinguishable from water.

This mystery Palissy expressed to his understanding by saying that solid matter, flowing as water in water, existed in the distinct state of a congelative water, whose purpose in the economy of nature was of vast importance, and which he called therefore a fifth element. Every substance that can be deposited from solution in water was, in the eyes of Palissy, a salt. The duty of this congelative water was, at the command of God, to penetrate by virtue of its fluid form along the roots into the stems of plants, and there congeal into a solid matter for their increase; to penetrate the strata of the earth, and deposit matter which should cause the growth of stones and so forth. Palissy uses as terms often convertible the phrases, salt and congelative water. From congelative water many kinds of salts are deposited. "Salts," Bernard says, "have some *affinity* together. The salt of the dead body being in the earth exercises *attraction* on another salt, which will be of another kind, and the two salts together might harden and transform the body of a man." Again, "I am quite sure that if the body of a man were interred in a place wherein there is some dormant water, among which there is congelative water, which forms crystal and other metallic and stony matters, that the said body would petrify: because the congelative germ is of a salsitive nature, and the salt of the body of the man would *attract* to itself the congelative matter, which is also salsitive, because of the *affinity* that is between the kinds,

they will come to congeal, harden and petrify the human body."

Palissy is speaking, in these passages, of the possible petrifaction of a human body by the same process which he describes as causing the conversion into stone or metal of wood, shells, and other organised productions. It will be seen that his theory is good, and that his fifth element or congelative water is a theoretical formula which might have been adopted for a time with very great advantage to the progress of philosophy. It is the name for a true thing, which Palissy saw in its true place in the economy of nature. The preceding extracts will also sufficiently illustrate the way in which Palissy makes the term salt a convertible term with his congelative water; they also happen to contain examples of the way in which Palissy used the words affinity and attraction, and brought such powers into play. We find in the works of Palissy the first example of the employment of these words in so philosophical a sense.

Enough has been said to indicate the way in which Palissy accounted for the existence of fossilised matter. Against the idea that fossil shells had been scattered abroad by the deluge, Palissy produces all those decisive arguments which would of course not escape his penetration. For example, "I will show you presently the picture of a rock, in the Ardennes near the village of Sedan, in which rock and in many others are to be found

shells of all the kinds depicted on this piece of paper: from the summit to the foot of the same, although the said mountain is higher than any of the houses or even the bell-tower of the said Sedan, and the inhabitants of the said place daily hew the stone from the said mountain, to build, and in doing so the said shells are found as well at the lowest as at the highest part, that is to say enclosed in the densest stones; I am certain that I saw one kind that was sixteen inches in diameter. I ask now of him who holds the opinion of Cardanus, by what door did the sea enter to place the said shells in the middle of the densest rock? I have already given you to understand that the said fishes were engendered on the very spot where they have changed their nature, keeping the same form that they had while living." This opinion of Bernard's was a bold leap out of darkness into light, from ill-regulated guesses into rational geology.

It will have been observed that in the preceding extract Bernard is found producing a picture of the rock which he takes as an illustration, and paintings of all the species of shell that it contained. Bernard was enthusiastic in his study of geology, and while the bent of his genius was towards generalisation—a thirst for the great truths of nature, towards which all science must tend—no man ever saw more clearly the importance of observing accurately the minute facts out of which alone great principles can be extracted. With marvellous acuteness Palissy saw the importance of a detailed study of fossils to the discovery of

geologic truths. Modern geology and all its grandest results are, in fact, founded upon a minute study of fossil forms. The first who pursued this study with discriminating zeal was Palissy, the self-educated Potter, who had put himself to school with Nature. He assigned to himself the task of taking copies of all the fossil forms he saw, in order to compare and study them. His studies in this direction soon made him aware of the large number of extinct forms of life included in the list of petrifactions. "I was desirous," he says, "of reducing or representing by picture the shells and fish which I had found lapified, to distinguish between them and the customary sorts, of which the use is common: but because my time would not permit me to put my design in execution while I was in deliberation upon this, having deferred for some years the above-named design and having always sought according to my power more and more for petrifactions, I at length found more fishes" (using the word fishes, of course, not in the modern scientific sense) "and shells in that form, petrified upon the earth, than there are modern kinds inhabiting the ocean * * for which reason I have been bold enough to say to my disciples that Monsieur Belon and Rondelet* had taken pains to describe

* Pierre Belon, born in 1518, studied natural history and the healing art. He was sent to Judæa, Greece, and Arabia, at the expense of the Cardinal de Tournon. He died, assassinated, near Paris. He wrote of coniferous trees, of birds, fishes, of observations in Greece, Asia, Judæa, Arabia, Egypt, and other works.

Guillaume Rondelet, born in 1507, went to Italy as travelling physician with the before-mentioned Cardinal de Tournon, from whom he

and figure the fishes found by them during a voyage to Venice, and that I considered it strange that they never troubled themselves to understand the fishes that formerly dwelt and multiplied abundantly in regions of which the stones, that have congealed at the same time when they were petrified, serve now as register or original of the forms of the said fishes."

How well Palissy consulted this register, whose value he was first to recognise, may be best understood by the conclusions drawn from it. From a study of the shells of Paris, he declared—and it is needless to say that he was first to declare—the former existence in that region of a great lake or basin of water. At the present day we ascribe this origin to the tertiary deposits, and speak geologically of the Paris basin. In the succeeding passage Palissy is speaking at first of the shell deposits about Paris formed "in the following manner—that is to say, there has been some great receptacle of water in which was an infinite number of fishes armed with pyramidal shells. And the said fishes have been engendered in the waters of the said receptacle by a gentle heat, whether proceeding from the open air and sun, or perhaps by a gentle heat which is found under the earth as I have perceived when entering the said quarries. * * And because the said

afterwards received a pension, upon which he married, settled in his native place, Montpellier, and practised medicine. He died in 1566. He wrote a History of Fishes, laboured with great care from personal observation and dissections, which obtained considerable note in his own day. His garden was stocked with fish-ponds, and some of his friends have recorded with wonder the zeal which urged him to continue his dissections while he ate his dinner.

lake was full of some salsitive and generative matter, that afterwards congealed, namely the water, the earth and the fishes. You will understand me better afterwards when I come to speak of the stones in the deserts of the Ardennes. And that is why one commonly finds in the rocks near the sea all kinds of fish bearing shells. It follows then that after the water has failed to the said fishes, and after the earth and water-bed in which they dwelt has been petrified by the same generative virtue as the fish, there are found as many shells petrified in the stone which has congealed from the said water-beds as there were fishes in the same, and the mud and the shells have changed their nature by the same virtue, and by the same efficient cause. I proved this point before my auditors by causing a great stone to be shown to them which I had got hewn from a rock near Soubize, a town bordering the sea: which rock had formerly been covered with sea-water, and before it was reduced into stone, there were a great number of many kinds of armed fish, which being dead in the mud, after the sea had retired from that spot, the mud and the fish petrified. The fact is certain that the sea has retired from that spot, as I verified, at the time when there was sedition in the districts of Xaintonge, when it was intended to establish the gabelle. For in those days I was commissioned to make a plan of the region of the salt-marshes; and being in the island of Broue, which makes a point on the sea-coast, where there remains a ruined tower, the inhabitants of the neighbourhood attested to me that the channel of the harbour of Brouage

was formerly seen to come up to the foot of the said tower, and that the said tower was built to keep out the pirates and sea-brigands, who in time of war came often to water their vessels at a fountain near to the said tower, and the said tower is called the tower of Broue because of the island on which it is placed, which is called Brou, whence the harbour of Brouage received its name. And inasmuch as it is at this day impossible to approach the said tower by way of the channel; one may know by this that the sea has retired, and that it may have gained as much ground in another place: as it happens also, that near the coast of Allevert, not far from the passage of Maumusson which is so very dangerous, the inhabitants of the district say that they passed formerly with ease on horseback from Allevert to the Isle of Olleron over a little ditch, or little arm of the sea which joined the open sea at its two ends. And now ships, whatever be their size, go by that passage as the shortest way from Bourdeaux to Rochelle, or to Brittany, to Flanders and to England: and formerly it was necessary to make a circuit of the Isle of Olleron. That is a testimony how the sea decreasing in one place, increases in another. Whence I infer that the rock which is full of many kinds of shells has formerly been a marine bed, producing fishes." The man who taught publicly geology like this in the year 1580, illustrating his lectures with a museum, with diagrams, and with experiments, deserves to be remembered in the history of science.

The complete scheme of modern geology derived from a study of fossils was of course beyond human grasp in the sixteenth century; but in every direction the keen sight of Palissy had indicated to him the true paths to better knowledge. Where even the bold spirit of Palissy did not venture to assert that open sea had been, in the depths of the mountains, he accounted for the fossils by the theory that there had been receptacles of water, filtering among the chinks and caverns of the rocks, from which salts were deposited, which passed away and left rock in their place. That every fossil became fossil where it had originally lived and stirred; that every water-animal had been deposited from water, and was included in the petrifaction of its mud and the congelative part of the water itself, Bernard taught emphatically. At the same time he pointed out that the number of land and fresh-water shells is very great, and that all shell-deposits therefore were by no means to be ascribed to either salt water or fresh water in every case. In speaking of marine shells, Palissy calls attention to the great mass of shells formed in the sea, and formed out of sea-water which must therefore have contained in solution the material of which they are formed, that is to say, in a state not distinguishable from water itself, in the state of congelative water, his fifth element.

In defining the growth of stones by addition to their substance, Palissy takes care to distinguish the mechanical increase from vital action. "Stones have no vegetative

soul, but insensible; wherefore they cannot grow by vegetative action, but by a congelative augmentation."

In the treatise upon marl, we find Palissy fulfilling his promise to inquire into that useful manure, and enunciating again many truths which he had learned on the subjects of agricultural chemistry and vegetable physiology. These subjects had not been studied in the time of Palissy, although other departments of botany had made some progress. Botany grew faster in her childhood than the sister sciences.

Though Pliny, who was no observer, continued long to be botanist in ordinary to the world, many real advances were made in the sixteenth century towards the acquisition of independent, valuable knowledge. Pliny was popular because he treated of the properties of plants, and that suited the feeling of the learned in an age of herbals. Plants were at first studied only for the cures they might be able to perform. Antonius Brasavola, who wrote a book on Simples,* in the year 1536, was the first who established a botanical garden; it was situated on the banks of the river Po. At nearly the same time Otho Brunfels, of Mentz, was the first modern who published figures of plants drawn from nature,† but not arranged according to any systematic plan.

Jerome Bock, a German, who translated his name into Hieronoymus Tragus, published a herbal in 1551, which

* Examen Omnium Simplicium Medicamentorum.

† Herbarum Vivæ Icones.

contains the first indications of an attempt at natural arrangement, and succeeds so far as to bring into respectable groups the labiate, cruciferous, and composite plants.

In the year 1565, Conrad Gessner, of Zurich, in a letter to Zuinger, writes in terms that entitle him to the distinction of being the first to distinguish genera by the character of the fructification. "Tell me," he says, "whether your plants have fruit and flower as well as stalk and leaves, for these are of much greater consequence. By these three marks, flower, fruit, and seed, I find that Saxifrage and Consolida Regalis are related to Aconite." Gessner, we are told by Haller, was the first establisher of a museum. The formation of collections is, however, a natural taste which must have arisen simultaneously among educated people. We have found Palissy referring to the cabinets of physicians and nobles in his own time, familiarly and as usual things. Palissy was the first by whom such a collection was thrown open to the public, and employed as part of the machinery of teaching. Gessner, who lived between the years 1516 and 1565, has been called (in compliment as well as disrespect the world likes to call names) the Pliny of Germany, was a naturalist who contrasted with Palissy, by being as curiously full as Palissy was empty of the learning of his time. By spare diet and rigorous employment of his hours, Gessner acquired a marvellous amount of erudition. He understood Greek, Latin, and Hebrew; he had a smattering of Arabic, and was familiar with French,

German, Italian, and Flemish. He compiled a voluminous history of animals, and a bibliographical work called the "Universal Library," containing the names and particulars of all scientific works published by the moderns in his time. He was a pious, modest, and pure-hearted scholar, who, when the plague extended to Zurich, and laid a finger on his shoulder, leaving there a monitory spot of purple, took the hint quietly, and retiring to his study, occupied himself in the final arrangement of his writings. Thus he was found by death, a man verging on fifty, who had lost few minutes since he ran alone upon the world. Gessner, however, studied in printed books, while Palissy spent equal labour and a longer life over the handwriting of nature. The Potter also had a genius equal to his industry.

Three years after the publication of Bernard's last book, Andreas Cæsalpinus, of Arezzo, a learned man whose profound knowledge of Aristotle did not impede his power of original research, published at Florence sixteen books "De Plantis." In his book plants were arranged according to an arbitrary system, but with so much skill that they fall practically very often into natural arrangement.

These facts indicate that in the science of botany more progress had been made than in other departments of natural history in Bernard's time. The Potter himself did nothing towards systematic botany. He was a minute observer, as the devices upon which he laboured in the pottery bear witness, but his great curiosity was directed to

the reasons of things, and to the application of whatever knowledge he obtained to useful ends. He was perpetually asking Why? over the results exhibited by nature. And when he had found out why, he inquired further, What good use can I make of this knowledge?

In the dialogue on Marl, Palissy again treats of the nutrition of plants by salts contained in water, in manures, and in the soil. He points out how, in the decay of foliage, the salts taken from the earth return to earth, become again earth, and will hereafter, mysteriously combined with water, be drawn up through the roots, and enter into foliage again.

"If you would contemplate," he says, "the reason why the roots of trees are so crooked, you will find that it is only because, as men look for the mountains, roads and by-paths that are easiest of passage, so roots in their growing seek the easiest, softest and least stony passage through the earth; and if there be any stone before a root it will leave the stone upon its way, and turn to the right hand or to the left; inasmuch as it could not pierce the stones that lie upon its way. As for the forking and the crookedness of the branches, that springs from another cause, which is that when the branches are pushing out their young shoots, each seeks the freedom of the air, and they dilate and separate from one another as much as they can, in order to have air at command."

In another passage we find Palissy recommending exploration of the soil, discussing stratification, and reveal-

ing the principle and practice of boring Artesian wells. It is said that these wells were first bored in Artois long before the time of Palissy. Some doubt the antiquity of the practice. The principle is contained in the following passage from the Treatise upon Marl. Palissy speaks of the search for marl. "I think the soil might be pierced easily by rods, and by such means one might easily discover marl, and even well-waters which might often rise above the spot at which the point of the auger found them: and that could take place provided they came from a place higher than the bottom of the hole that you had made." This is certainly the first statement of the true theory of Artesian wells. It is a corollary from Bernard's theory of springs.

Theory might well ask, looking back upon the whole body of doctrine taught by the old Potter in the last years of his life,

"Where have you found all this written? or tell me in what school you have been, from which you might have learned what you are telling me.

"PRACTICE.—I have had no other book than the heavens and the earth, which are known of all men, and given to all men to be known and read. Having read in the same I have reflected on terrestrial matters, because I had not studied in astrology to contemplate the stars."

CHAPTER XI.

THE REWARD OF THE PHILOSOPHER.

THE lectures in which Bernard Palissy explained the doctrines of which a brief outline has now been given, were commenced, as we have already seen, early in the year 1575, when Palissy was sixty-six years old. They were still being delivered in the year 1584. Very few months before the commencement of these lectures, Charles IX. had been succeeded by his brother, Henry III., the third of the sons of Catherine of Medicis, who in succession occupied the throne of France. The reign of this king covered the last years of the life of Palissy, and in this reign the troubles of France again created trouble for the Potter.

It might, indeed, have been trouble enough for the old man if there had been no direct interference of the state with his career; it might have been trouble enough to live in Paris in those days, and teach what he had learnt

from solemn communing with nature in the midst of vice, frivolity, and riot. Since the time of Francis I., the court of France had been like a neglected ulcer, growing daily a more loathsome object of regard. If Henry, when, at the age of twenty-three, he came from the throne of Poland to the throne of France, brought any cleanness with him, he brought it among lepers, and was rapidly polluted by their contact. There was reason to hope well of him. As Duke of Anjou, he hadbeen made a general at the age of fifteen, and won two battles—at Jarnac and Montcontour—before the coming of his beard. Then he was King of Poland, and at the age of about twenty-three he became King of France. At the beginning of his reign, the neutral Catholics joining the Huguenots made one side of a civil war. We have passed over many years of politics which did not concern Bernard Palissy; the state of France during the interval may be inferred from the fact that this, which began in the reign of Henry III., was the fifth civil war—a languid struggle, for the vigour of the country was exhausted.

Since the Massacre of St. Bartholomew, the mobs of Paris had become familiar with blood, and the whole temper of society had taken an aspect of increased ferocity. Assassination was the common end of a dispute. Cosmo Ruggieri, a Florentine astrologer, ministered largely to the superstition of all classes, and was regarded as a professor of the art of poisoning. Tortures and executions were frequent, at which Charles IX. had been in

the habit of assisting with his presence; and Henry III. followed the example of his predecessor. From such scenes the eyes of women were not averted. Women were courted with fierce mockéries of passion; love-letters were indited in the writers' blood; and in the intense corruption of the public morals, the king and his court, wearied with complaisance, created women out of men. Courtiers wore feminine attire, had earrings fitted into their ears by the king, or by some chosen friend or lover, took presently the name of mignons—minions—and devoted themselves to the utmost wickedness and folly. Confusion filled the kingdom throughout the entire reign of Henry III.; hand after hand threatened to drag him from the throne into a coffin or a monastery. Now and then the king appeared to be aroused, and with a skilful stroke he at one time turned the tables on his adversaries; but then he sank again into the filth of his court, and yielded up his manhood. "The fire was dead on the hearth of his heart, and the fiercest gale," says D'Aubigné, "could only set the ashes flying."

The king and the young nobles, in the grounds and lower chambers of the Louvre, ran races, leapt ditches, tried pistol-shots and poniard-points. He was proudest who could talk most loudly, whether with or without truth, of his feats as a seducer or assassin. Ridiculously curled, and tricked out with stiff, affected garments, the king and his friends were to be seen frequently shouting through the streets of Paris, capering at fairs, insulting traders,

always with a poniard ready. The young men affected wild attachments to each other, called each other by affected names; and when a Pythias was absent on a trivial journey, his Damon would wear mourning and refuse meat. Or they would quarrel. The Seigneur St. Phal pointed out an embroidered Z upon a garment; the Seigneur Bussi, by way of picking up a quarrel and enhancing his own credit as a bully, affirmed that it was no Z, but a Y. They challenged each other, and kept up for years upon this point a remorseless feud. Another noble, high in the king's favour, under some provocation pierced the body of his wife, destroying her with unborn twins. The Duke of Guise, Le Balafré, the murderer of Coligny on St. Bartholomew's-day, and a degenerate son of the duke who died before Orleans, pursued a victim, poniard in hand, into the presence of the king.

The Duke of Guise was the unworthy idol of the extreme Catholic party, to which, since the Day of St. Bartholomew, the town of Paris had most heartily belonged. It was desired to create this duke into a king, at the expense of Henry; and had not the duke wanted steadiness of purpose, the desire would probably have been accomplished. The tumult of a violent party pressed the Duke of Guise sometimes to the very steps of the throne, while Henry—the record of his character is in his journal,—there one reads that, "In spite of all the affairs of the war and the rebellion that the king had on his hands, he commonly went in a coach with the queen, his

wife, through the streets and houses of Paris to take the little dogs that pleased them; went also through all the nunneries in the environs of Paris, to make the like search for little dogs, to the great regret of those who had them."

In the year 1585, this king, finding no other way of saving himself from the imminent danger in which he was placed by the extreme Catholic party, put himself at the head of their league, and issued a decree prohibiting the future exercise of the Reformed worship on pain of death, and banishing all those who had previously adhered to it.

Palissy was then an old man of seventy-six, still teaching philosophy, and still superintending his workshop in the abandoned palace of the Tuileries. In his lectures and in his book, Bernard abstained from all allusion to the struggles of the time. He preserved his religion pure, but turning from the horrors of the civil strife, in which Scripture texts were written upon flags, and psalms sung to the roll of drum, he abstained wholly from religious controversy. He was known, however, as a Huguenot, and no royal ordinance could alter his convictions, or drive the sturdy Potter, in alarm, out of the way that he had chosen as the way of truth. It was said, therefore, of the old man, "He regardeth not thee, O king, nor the decree that thou hast signed;" and Palissy was sent to the Bastille.

Sentence of death, executed upon many who remained unmoved in their worship by the king's decree, was de-

layed, in the case of Master Bernard, only by the artifice of friends in power, and chiefly the Duke of Mayenne, who caused all possible delays to interrupt the suit against him.

Four more years of life remained to Palissy, all spent within the four walls of his prison. After a time, two fair girls, daughters of Jacques Foucaud, attorney to the parliament, condemned like Bernard for their firm religious faith, shared with the Potter his captivity. The old man and the girls sustained each other, and awaited death together.

Outside the prison doors, France was in tumult. News came to Paris of the gallant exploits of the little band of knights and soldiers led by Henry, King of Navarre, and his friend Sully. Poor enough in purse, and with a little army, the King of Navarre was dashing with an unexpected strength into the tide of war, a hero to the Protestants. The Duke of Guise remained the hero of the violent among the orthodox. He scarcely dared be king. A conclave, called the Sixteen, formed itself on his behalf into a wild species of election committee, but he dared not act. He was invited by the Sixteen to Paris, and by the king forbidden entrance to the capital; he came, he was received with frantic applause, yet ventured in a hesitating mood into the king's presence, where the question of his assassination had been the last topic of discussion. In the king's presence, he saw that the whispered argument

was whether he should be suffered to go out alive; but the king feared the people at the palace gates. Guise hastily retiring, placed himself at the disposal of the Sixteen. The king sent troops into the town, the people threw up barricades. There was open insurrection. Guise had all qualities except the boldness needed for a perfect act of usurpation. The revolt, therefore, was stilled for a time without producing revolution. The king's unpopularity among the extreme party of the orthodox which governed Paris was displayed in a way suited to the times. Superstition introduced into the temple something worse than money-changers. There was placed in one of the churches of Paris a waxen image of the king, executed in accordance with the rites of witchcraft, into which all good Christians were invited to stick pins.

For the death of unsentenced Reformers the Sixteen were clamorous; one of them, Mathieu de Launay, who had at one time been a minister in the Reformed Church, solicited especially the public execution, already too long deferred, of the old Potter. This happened in the year 1588, when Palissy was seventy-nine years old, and the age of King Henry III. was thirty-seven. The king,—starched, frilled, and curled, according to his own fantastic custom, frequently visited the prisons, and felt interest in the old man, whom he regarded as an ancient servant of his mother. Finding that his age would not protect him from the stake, the king one day held with the Potter

this discourse, which has been preserved for us in a contemporary record.*

"'My good man," said the king, "you have been forty-five years in the service of the queen, my mother, or in mine, and we have suffered you to live in your own religion, amidst all the executions and the massacres. Now, however, I am so pressed by the Guise party and my people, that I have been compelled in spite of myself to imprison these two poor women and you; they are to be burnt to-morrow, and you also, if you will not be converted."

"Sire," answered the old man, "the Count de Maulevrier came yesterday, on your part, promising life to these two sisters, if they would each give you a night. They replied that they would now be martyrs for their own honour, as well as for the honour of God. You have said several times that you feel pity for me; but it is I who pity you, who have said 'I am compelled.' That is not speaking like a king. These girls and I, who have part in the kingdom of heaven, we will teach you to talk royally. The Guisarts, all your people, and yourself, cannot compel a Potter to bow down to images of clay."

The girls were burnt a few months afterwards, in June 1588. The news of their death reaching the Huguenot camp, Monsieur du Plessis said to the King of Navarre, shortly to be King Henry IV. of France: "Courage, sire, since even our girls can face death for the Gospel."

* Confession de Sancy, chap. vii. In D'Aubigné's Hist. Univ., part iii., book iii., chap. i., the same story is told more briefly.

King Henry III., having relieved himself, by assassination, of the Duke of Guise and his brother, their surviving sister took secure revenge. Instructed by her, a monk named Clement, kneeling before the throne in supplicating attitude, stabbed the king in the belly. The monk was of course promptly slaughtered by the guards. The king was stabbed to death, and perished thus in the year 1589.

The murder of the king was counted as a holy deed by the fierce Guisarts, who set up a statue of the murderer for public adoration, having this inscription on the pedestal: "St. Jaques Clement, pray for us sinners." In the same year Palissy the Potter died in the Bastille.

THE END.

APPENDIX.

APPENDIX.

NOTE A.

DATE OF THE BIRTH OF PALISSY.

In the preceding narrative I have assumed the year 1509 as the date of the birth of Palissy; no grounds exist for adhering positively to that or any other year. D'Aubigné says in his History, first published in the years 1616-19, when speaking of the year 1589, which is unquestionably the date of Bernard's death, "Mathieu de Launay solicited that the aged Bernard, inventor of excellent pottery, should be brought to execution; but the Duke de Mayenne caused his suit to be prolonged, and *his age of ninety years* performed for him the work of death in the Bastille."

If Palissy died at the age of ninety, he was in every stage of his life ten years older than he has been represented in the narrative. The date of his exploration of the salt-marsh is ascertainable by reference to edicts, and is certainly the year 1543. When Henry III., speaking to Palissy in prison in the year 1588, tells him that he has been forty-five years in the royal service, he refers back to that same year 1543 in which Palissy first received a commission to perform work for the crown. That survey of the marshes took place early in the history of Bernard's struggles as a potter, and it is not easy to suppose that he was then already forty-five years old, and eighty-five in the year 1584, when the Sieur de la Croix du Maine wrote concerning him from personal observation that he was then lecturing at Paris, *aged sixty years and upwards.*

Our judgment between these discrepancies is much assisted by the fact that D'Aubigné could not have taken much pains to find out the exact ages of the persons about whom he wrote; where we are not in uncertainty a reference to his History shows that we should now and then, if we followed him in such matters, be grievously misled. To the old age of the Cardinal de Bourbon, for example, D'Aubigné adds no less than fourteen years. We are not bound, therefore, because D'Aubigné has said it, to believe that Palissy died at the age of ninety.

Referring, then, to the year 1584, when La Croix du Maine speaks of Bernard Palissy as being a lively man, sixty years old and upwards, we have to consider how much "upwards." Sixty years old would not do, for if he were sixty in 1584, he would have been only twenty-one when he surveyed the salt-marshes; and he was then married and settled, after having spent not a few years in travel as a glass-painter, residing several years and following his business in a single town. According to the birth-date assumed in the narrative, Palissy was fifteen years older than sixty in the year 1584; nevertheless, when we call to mind the vigour both of mind and body by which Palissy had always been distinguished, we find nothing surprising in the fact that at the age of seventy-five he should have been described from personal opinion as a man of "sixty years and upwards." After four years' confinement of Palissy's free limbs in the Bastille, and after he had breathed for four years the unwholesome atmosphere of a prison, as prisons were three hundred years ago, there might seem to be added fourteen instead of four years of infirmity to the preceding seventy-six years of health. Palissy was eighty years old at his death, according to the theory adopted in these pages, and might well, with his face wasted and paled by privation, set in his white hair (for that had been white when his last book was published), die like an old man of ninety in his prison.

Guided, then, by the statements of La Croix du Maine and D'Aubigné, without adopting either, it is possible to reconcile them both. We know that Palissy travelled for some years before his settlement in Saintes, that at Saintes he attempted to live by his old calling before attempting anything in pottery, while he had begun his attempts in pottery, and had children to care for, before he was called upon to survey the salt-marshes; we may therefore think it reasonable to sup-

pose that his age, when he made the survey, was about thirty-four, and that if so, he may have married at the age of twenty-seven. Various considerations of this kind, tedious to relate, which arise out of the facts and known dates in Bernard's life, have thus led to the belief that the year 1509, if not the precise date of the birth of Palissy, cannot be far wrong. If Palissy was not born in the year 1509, the true date must be one, two, three, or four years earlier.

NOTE B.

TRAVELS OF PALISSY.

THE following, among other passages to be found in the works of Palissy, refer to places visited by him. The reference in each case is to a page in the edition of the works of Palissy published in 1844 :

"One day when I was in the islands of Xaintonge on the way from Marennes to Rochelle, I observed a ditch, &c." Page 37.

"Once when I was at Tours during the *grands jours de Paris*, which were then held at the said Tours, there was a Grand-Vicar, &c." Page 17.

"You will find in the churches of Poitou and Brittany an infinite number of glasses which are corroded on the outside by the injuries of time, &c." Page 50.

"There are in France more than four thousand noble houses in which the said convenience might easily be found, especially along the rivers, as you might say along the river Loire, the Gironde, the Garonne, the Lot, the Tar, &c." Page 58.

A description of the Pont de Gard, in Languedoc, and allusion to the town of Nismes, apparently from personal recollection. Page 145.

"I have never seen a stranger come into the district of Bigorre to live there, who has not soon afterwards taken a fever." Page 148.

"I lived some years at Tarbes, principal town of Bigorre." Page 153.

Alluding to the waters of Spa, Palissy says :—"There are in many villages of the district of Liege springs of the same quality. But the inhabitants of Spa were among the first in announcing theirs, whence they derive great profit. * * In the Ardennes many of the springs must be equally good, because the yellow clays there testify that iron mines abound." Page 154.

"I have often seen such thick vapours rising in the district of the Ardennes, and they who saw them at the same time with me said that we should soon have rain, being well assured that the said vapours would dissolve into water. I have seen on the Pyrenees such vapours many times arising, which on the heights were frosted into snows, and very shortly afterwards the said snows covered all the land." Page 164.

"There are to be seen in many parts of France, especially at Nantes, bridges of wood, before which, &c." Page 173.

The whole essay on the bore in the Dordogne (pages 184-187) shows minute personal acquaintance with the rivers Dordogne and Garonne in the lower part of their courses.

"I have one which I showed to the master-mason of the fortifications of Brest in Lower Brittany, who assured me, &c." Page 219.

"I have seen cleverer tricks done in a little town of Poitou, where there was a doctor, &c." Page 228.

"The regions of Xaintonge, Gascony, Agen, Quercy, and Toulouse, are very subject to the said worms. * * I undertake to bear witness only about regions that I have frequented." Page 247.

"A stone that I had hewn from a rock near Soubize, a town upon the borders of the sea." Page 276.

"I never saw natural oysters or their shells in greater quantity than they are found petrified in many rocks of the Ardennes." Page 279.

"In the town of Angers there is a master-goldsmith, named Marc Thomaseau, who showed me a flower reduced into stone." Page 284.

"The Pyrenees, where there is found good marble. It is found also at Dinan, which is a cold and rainy district. On the mountains of Auvergne there is found crystal. * * The countries bordering on the Ardennes, especially along the road from Mezières to Antwerp: a thing more marvellous than any other I have seen, for along the river Meuse, in the district of Liege, the said river passes between mountains which, &c." Page 295.

References to the Ardennes are very frequent.

"I have seen the enamellers of Limoges selling, &c." Page 307.

"I have seen all the region of Gascony and the surrounding places, so overstocked with earthen figures, &c." Page 308.

"I had seen marl in the district of Armagnac." Page 325.

"You may easily perceive this in the regions of Valois, Berri, and Champagne, where the said marl is found abundantly, and chalk in still greater abundance." Page 331.

"In Lower Burgundy, there is a certain village, in which men dig for an argillaceous earth, similar to marl." Page 343.

Palissy describes (page 850) the change of vegetation to be observed on traversing France from Paris, northward and southward.

"I was told by the inhabitants of Champagne, Berri and Picardy, that in certain places, &c." Page 356.

The frequent reference to the Ardennes throughout the works of Palissy show that Bernard must have spent some time in that corner of France most remote from the Pyrenees, while in the Upper Pyrenees, at Tarbes, he tells us that he spent some years. From Antwerp in the east, to Brest in the most westerly parts of Brittany; from Brittany to the Pyrenees; along the southern coast through Montpellier and Nismes (both of which towns are mentioned by Palissy); across France between these extreme points, and through Limousin, Perigord, Auvergne, Berri, Burgundy, Champagne, the extent of the travels of Palissy may be traced without difficulty in his writings.

NOTE C.

EDITIONS OF THE WORKS OF PALISSY.

"RECEPTE VERITABLE, par laquelle tous les hommes de France pourront apprendre à multiplier et à augmenter leurs thrésors. Item, ceux qui n'ont jamais eu cognoissance des lettres, pourront apprendre une philosophie nécessaire à tous les habitants de la terre. Item, en ce livre est contenu le dessein d'un jardin autant délectable et d'utile invention, qu'il en fût oncques veu. Item, le dessein et ordonnance d'une ville de forteresse, la plus imprenable qu'homme ouyt jamais parler: composé par maistre Bernard Palissy, ouurier de terre, et inventeur des rustiques figulines du Roy, et de monseigneur le Duc de Montmorency pair et connestable de France; demeurant en la ville de Xaintes. La Rochelle, de l'imprimerie de Barthélemy Berton, 1563."

A copy of this in the royal library at Paris, and the copy in the British Museum, where it is bound up with old tracts on gardening, &c., are the only two copies known to be in existence. On the title-

page is a man labouring heavenward, with a large stone tied to his leg, surrounded by the motto, "POVRETE EMPECHE LES BONS ESPRITS DE PARVENIR." The first part of the title of this work refers playfully to the books published by alchemists. The volume (without pagination) contains 132 pages.

"DISCOURS ADMIRABLES de la nature des eaux et fontaines, tant naturelles qu'artificielles, des métaux, des sels et salines, des pierres, des terres, du feu et des émaux; avec plusieurs autres excellents secrets des choses naturelles. Plus, un traité de la Marne, fort utile et nécessaire à ceux qui se mellent de l'agriculture. Le tout dressé par dialogues, ès quels sont introduits la théorique et la practique. Par Me BERNARD PALISSY, inventeur des rustiques figulines du Roy, et de la Royne sa mère. A Paris, chez Martin le jeune, à l'enseigne du Serpent, devant le college de Cambray, 1580."

Copies of this are very rare. It is a neat little 8vo. of 361 pages, with a summary of leading sentences and glossary of scientific terms.

In 1636 the two works were combined and republished in a couple of 8vo. volumes, under the following titles. To the first volume: "LE MOYEN DE DEVENIR RICHE, et la manière véritable par laquelle tous les hommes de la France pourront apprendre à multiplier leurs thrésors et possessions; avec plusieurs autres excellents secrets des choses naturelles, desquels jusques à present l'on n'a ouï. A Paris, chez Robert Fouet, rue S. Jacques, à l'occasion deuant les Mathurins, 1636."

To the second volume: "Seconde partie du MOYEN DE DEVENIR RICHE, contenant les DISCOURS ADMIRABLES de la nature des eaux et fontaines, &c., par Me BERNARD PALISSY, inventeur des rustiques figulines du Roy."

This was a catchpenny edition, with additions and omissions, by which the heretical Palissy was to be made inoffensive to the orthodox clergy. There is also in this edition the name of Palissy appended to an Epistle to the French People, which is a patchwork composition, made of pieces taken from his other writings, held together by the thread of some bookseller's cutter and contriver. The volumes are respectively of 255 and 526 pages.

No other edition of the works of Palissy appeared until the publication in a handcome quarto of the "ŒUVRES DE BERNARD PALISSY, Revue sur les Exemplaires de la Bibliothèque du Roi, Avec des Notes;

par M. Faujas de Saint Fond, et des Additions par M. Gobet. A Paris. Chez Ruault, Libraire, rue de la Harpe, 1777."

This edition is prefaced with a scanty and careless essay on the life of Palissy, and extracts from the authors who have mentioned him. It is very rich in notes and documents, and forms a handsome volume of 730 pages.

Its chief faults are the occasional suppression of plain-speaking passages, and an arbitrary division and arrangement of the writings of Palissy, so that there is no clue in the book by which one might detect their original arrangement. In this edition the "Déclaration des Abus et Ignorances des Médecins" is for the first time ascribed to Palissy, and it is there printed in the middle of his works.

The notes and documents in the edition of 1777 manifest great research, for the purpose of throwing light upon the names of obscure men mentioned by Bernard. The book is very learned in recondite matters, and in the preceding pages I have often been indebted to it for information drawn from sources not within the reach of students in this country. That is the whole merit of the book. It provides many little details which assist our comprehension of the works of Palissy, but some of its details are useless, and none of them lead to any large results. The times of Palissy are not illustrated at all; the prefatory researches into the facts of the life of Palissy are so careless, that while the date of the survey of the salt-marshes is set down at 1543, it is said that "about the year 1545" Palissy saw the enamelled cup by which his emulation was excited—a blunder incompatible with any thought at all upon the narrative left to us by the Potter. The volume is further vitiated by the interweaving of conclusions drawn from a work which Palissy most probably did not write, "The Déclaration des Abus des Médecins," and which MM. de Saint Fond and Gobet lose no opportunity of pressing into service as their own peculiar, critical discovery. The few allusions to the history of the time are not trustworthy; the Count de la Rochefoucault, for example, is quoted as a Royalist, and the notes on the science and philosophy of Bernard frequently turn right into wrong, do nothing in the way of illustration, and are worthless altogether.

This edition of the works of Palissy is not particularly rare, if I may judge from the facility with which a (second-hand) copy was found for

me in Paris, through the agency of Mr. Nutt. Its cost, whole bound, was twelve shillings.

A much better edition of the works of Palissy, in a neat small 8vo. volume (pp. 477), priced at about five shillings—the last that has been issued—is entitled: "Œuvres Completes de Bernard Palissy, Edition conforme aux Textes originaux imprimés du vivant de l'Auteur; avec des Notes et une Notice Historique. Par Paul-Antoine Cap. Paris, J. J. Dubochet et Cie, Rue de Seine, 33, 1844."

The preliminary notice of the life of Palissy in this edition is much fuller and much more correct than in the quarto of 1777. The works are printed without the least alteration from the original editions, and placed in their true sequence. The best of Gobet's notes, and a few others, are added here and there, while the "Déclaration des Abus et Ignorances des Médecins," which the editor refuses to ascribe to Palissy, is printed in an Appendix, in order that the reader may find nothing omitted.

Of this edition, I am afraid, there are only too many copies in the publisher's warehouse. The name of Palissy as a writer is so obscure, that the republication of his works in a conscientious edition has fallen almost dead from the press. Since I have hope that among the readers of the preceding narrative there will be some who are induced to place the works of Palissy upon their shelves, it gives me pleasure to know that there exists an edition neat as any lady could desire, and accurate as any scholar could think necessary.

All the editions here mentioned are to be seen in the library of the British Museum. The Museum catalogue adds a Dutch edition of Le Moyen de Devenir Riche, said to have been published at Amsterdam in 1655. Such an edition is nowhere else mentioned, and the book there referred to is no more than an old Dutch pamphlet with some trifling similarity of title.

From the Works of

BERNARD PALISSY:

Selected for the Illustration of

HIS LIFE & CHARACTER.

THE ARTIST IN EARTH.

To procure for this discourse more ready comprehension, we shall treat it in the form of Dialogue, in which we will introduce two persons, the one will inquire, the other will reply, as follows:

THEORY.—You promised to teach me the art of Pottery: and when you gave me so long a discourse on the diversities of argillaceous earths, I was very much pleased, thinking that you designed to show me the whole of the said art; but I was quite amazed when, instead of continuing, you put me off until another time, in order to make me forget the affection that I have to the said art.

PRACTICE.—Do you think that a man of sound judgment would thus yield up the secrets of an art which have cost much in the invention? As for me I have resolved on doing no such thing, for I do not know your title to them.

THEORY.—Then there is no charity in you. If you will keep your secret thus close, you will carry it into the

grave, and nobody will get it; so that your end will be accursed: for it it written, that according as each shall have received the gifts of God, so must he distribute them to others: I may conclude from this, if you do not teach what you know of the before-mentioned art, that you abuse the gifts of God.

PRACTICE.—It is not with my art, nor with my secrets, as with many others. I know well that a good remedy against a plague or other pernicious malady ought not to be hidden. The secrets of agriculture ought not to be hidden. The hazards and dangers of navigation ought not to be hidden. The word of God ought not to be hidden. The sciences which are the common servants of the whole republic ought not to be hidden. But with my art of treating earth, and several other arts, it is not so. There are several honourable inventions which are polluted and despised through being too common among men. Also, several things are exalted in the houses of princes and nobles, which, if they were common, would be esteemed no more than old kettles. I beg you to consider awhile our glasses, which, through having been too common among men, have fallen to so vile a price, that the greater part of those who make them live more sordidly than Paris porters. The occupation is noble, and the men who work at it are nobles; but several who exercise that art as gentlemen would gladly be plebeians, and possess wherewith to pay the taxes. Is it not a misfortune that has fallen on the glass-workers of Perigord, Limousin, Xaintonge, Angoulmois, Gascony, Bearn, and Bigorre, where glasses are so much depreciated that they are sold and cried through the villages, by the same people who cry old clothes and old iron, in such a manner that both those who make and those who sell them must work

hard to live? Consider awhile, also, the enamelled buttons (which are an invention so polite), which were at first sold for three francs the dozen. Now, inasmuch as those by whom they were invented did not keep their invention secret, in a little while afterwards the greediness of gain, or the poverty of persons, caused so large a number to be made, that they were obliged to sell them at a sol the dozen; so they are now come into such contempt that men are ashamed to wear them, and say that they are only fit for nobodies, because they have become too cheap. Have you not seen, too, the enamellers of Limoges, who, for want of having kept their invention secret, have caused their art to become so vile that they can hardly get a living at the price they put upon their works. I assure you I have seen given at three sols a dozen the figured badges worn on caps, which badges were so well laboured, and their enamels so well melted over the copper, that no picture could be prettier. And that has not occurred once only, but more than a hundred thousand times; and not in the case only of those badges, but of ewers, salt-cellars, and all other kinds of vessels and other affairs that they have undertaken to make: a matter much to be regretted. Have you not seen, too, how the engravers have damaged painters and skilled designers? I remember to have seen stories from the life of Our Lady, printed in large outline, according to the invention of a German, named Albert; which stories fell once into such contempt, on account of the abundance in which they were supplied, that each of them was sold for two liards, although admirably designed and drawn.*

* By Albert Durer. What would they sell for now? Palissy's diligent editor of 1777, M. Faujas de St. Fond, looked for these

Have you not seen, too, how cast-making has done injury to several clever sculptors? because, after one of them has spent long time over the making of some figure of a prince or princess, or whatever else is excellent, if it should get into the hands of some cast-maker, he will produce the same thing in so large a quantity that neither the name of the creator nor his work shall any more be known; and he will sell the figures at a vile price, on account of the diligence with which the casts are manufactured, to the great regret of him by whom the piece was laboriously chiselled. I have seen such contempt of sculpture, caused by the before-named cast-making, that the whole land of Gascony and surrounding places were full of moulded figures, in baked earth, which had been brought for sale to fairs and markets, and there sold at two liards a-piece; hence it occurred, that at the time when people commenced wearing tight dresses there was a man who was imprisoned and whipped, because he went through the whole town of Toulouse with a bale full of crucifixes, crying, "Crucifixes! crucifixes!—tightly dressed!"*

You can understand easily from these examples, and from a thousand others like them, that it is more worth while for a man, or a small number of men, to make their profit of an art, while living honestly, than for a number not so very great to inflict such serious damage upon one another, that they have not means to live except by profanation of the arts, and leaving things half made, as we see done commonly

woodcuts, and found them in the king's collection. They form a series of fifteen pictures, the dimensions of each being 10½ by 7½ inches. They bear date 1510 and 1511.

* "*A la Busque.*" Clothed figures of the crucified Saviour were long common in the south of France and Flanders.

in all those parts at which there are too many labourers. Nevertheless, if I thought you would lock up my precious secret as carefully as it requires, I would then let you learn it willingly.

THEORY.—If it please you to teach me, I promise to be as silent as any other man you could instruct.

PRACTICE.—I would do a good deal for you, and would seek your advancement as heartily as if you were my own child, but I fear that in showing you the art of treating earths, I should be pushing you back rather than forward. The reason is, that you have need of two things, without which it is impossible to do anything in pottery. The first is, that you must be wakeful, nimble, handy, and laborious; secondly, you must have some property, to bear the losses that accrue from practising this art. Now, since you are indigent in both respects, I counsel you to seek some other means of living, more indulgent and less hazardous.

THEORY.—I think that you say these things, not out of the pity that you have for me, but because you find it troublesome to keep your promise and reveal to me the secrets of your art. As for your plea, I know that when you first set yourself to seek the knowledge of the said art, you had not much in your pocket to support the losses and mistakes that you say spring out of its labour.

PRACTICE.—That is true; I had not much in my pocket, but I had means which you do not possess—for I had painting. They thought me, in our country, a better painter than I was, which caused me to be often summoned to draw plans for use in courts of law. Then, when I had such commissions I was very well

paid; besides, I for a long time practised glass-painting, until I was assured that I could earn bread by labour upon earth: also, while exploring for the said art, I was alchemist enough to live upon my teeth, which you would find it troublesome to do. You see, then, how I slipped over the time employed in searching for my art.

THEORY.—I know that you endured much poverty and pain in searching, but it will not be so with me; for that which gave you so much to endure, was the fact that you were entrusted with a wife and children. Then, while beforehand you possessed no knowledge, and were forced to guess your way, through this you were made unable to quit your household to go and learn the art in some shop, and you had no means of engaging servants who might help you somewhat to discover the right way. These drawbacks were the cause of your checks and miseries; but it will not be so with me, because, according to your promise, you will tell me in writing all the means of obviating the losses and hazards of the furnace, also the materials of which your enamels are made, and their proportions, measures, and composition. You doing so, why shall I not make pretty things without being in danger of any loss, provided that your losses serve as an example to protect and guide me in the exercising of your art?

PRACTICE.—Had I employed a thousand reams of paper in writing for you all the accidents that have occurred to me upon my search, you may assure yourself that, however clever you might be, there would occur to you a thousand other crosses which could not be taught by letters, and which, even if you had them written, you would not believe until you should have been thrust by

experience among a thousand troubles. Nevertheless, that you may have no occasion to lay falsehood to my charge, I will here place before you, in their order, all the secrets that I have discovered in the art of pottery, together with the compositions and different effects of enamels; I will tell you, also, the diversities in argillaceous earths, which will be a point that you ought well to note. Then, in order that you may the better understand these things, you shall have a discourse commencing with my first efforts after I had made it my duty to seek for the said art; and thereby you will hear the calamities that I endured before I could accomplish my design. I think that when you shall properly have heard the whole, you will feel little desire to follow my profession, and assure me that as much as you now seek to enter, you will then endeavour to avoid its precincts; because you will perceive that one cannot pursue, or put in execution any design, to work it out with beauty and perfection, except with great and extreme labour, that does not come alone, but is always accompanied by an army of anxieties.

THEORY.—I am a natural man like yourself; and since these things have been possible to you without a teacher, to me they will be much more easy, when I shall have obtained from you a complete discourse on the whole method of acting, and the means by which you have attained success.

PRACTICE.—According to your request, learn that it is more than five-and-twenty years since there was shown to me an earthen cup, turned and enamelled with so much beauty, that from that time I entered into controversy with my own thoughts, recalling to mind several suggestions that some people had made to me in

fun, when I was painting portraits. Then, seeing that these were falling out of request in the country where I dwelt, and that glass-painting was also little patronised, I began to think that if I should discover how to make enamels, I could make earthen vessels and other things very prettily, because God had gifted me with some knowledge of drawing; and thereafter, regardless of the fact that I had no knowledge of clays, I began to seek for the enamels, as a man gropes in the dark. Without having heard of what materials the said enamels were composed, I pounded, in those days, all the substances which I could suppose likely to make anything; and having pounded and ground them, I bought a quantity of earthen pots, and after having broken them in pieces, I put some of the materials that I had ground upon them, and having marked them, I set apart in writing what drugs I had put upon each, as a memorandum; then, having made a furnace to my fancy, I set the fragments down to bake, that I might see whether my drugs were able to produce some whitish colour: for I sought only after white enamel, because I had heard it said that white enamel was the basis of all others. Then, because I had never seen earth baked, nor could I tell by what degree of heat the said enamel should be melted, it was impossible for me to get any result in this way, though my chemicals should have been right; because, at one time the mass might have been heated too much, at another time too little; and when the said materials were baked too little or burnt, I could not at all tell the reason why I met with no success, but would throw blame on the materials, which sometimes, perhaps, were the right ones, or at least could have afforded me some hint for the accomplishment of my intentions,

if I had been able to manage the fire in the way that my materials required. But again, in working thus, I committed a fault still grosser than that above named: for in putting my trial-pieces in the furnace, I arranged them without consideration; so that if the materials had been the best in the world, and the fire also the fittest, it was impossible for any good result to follow. Thus, having blundered several times at a great expense, and through much labour, I was every day pounding and grinding new materials, and constructing new furnaces, which cost much money, and consumed my wood and my time.

When I had fooled away several years thus imprudently with sorrow and sighs, because I could not at all arrive at my intention, and remembering the money spent, I resolved, in order to avoid such large expenditure, to send the chemicals that I would test to the kiln of some potter; and having settled this within my mind, I purchased afresh several earthen vessels, and having broken them in pieces, at was my custom, I covered three or four hundred of the fragments with enamel, and sent them to a pottery distant a league and a half from my dwelling, with a request to the potters that they would please to permit those trials to be baked within some of their vessels: this they did willingly; but when they had baked their batch, and came to take out my trial-pieces, I received nothing but shame and loss, because they turned out good for nothing; for the fire used by those potters was not hot enough, and my trials were not put into the furnace in the required manner and according to my science. And because I had at that time no knowledge of the reason why my experiments had not succeeded, I threw the blame (as I before said)

on my materials; and beginning afresh, I made a number of new compounds, and sent them to the same potters, to do with as before; so I continued to do several times, always with great cost, loss of time, confusion, and sorrow.

When I saw that I could not at all in this way come at my intention, I took relaxation for a time, occupying myself in my art of painting and glass-working, and comported myself as if I were not zealous to dive any more into the secret of enamels. Some days afterwards, there arrived certain commissaries, deputed by the king to establish the gabelle in the district of Xaintonge, who appointed me to map the islands and the country surrounding all the salt-marshes in our part of the world. Then, when the said commission was ended, and I found myself paid with a little money, I resumed my affection for pursuing in the track of the enamels; and seeing that I had been able to do nothing, whether in my own furnaces or in those of the before-mentioned potters, I broke about three dozen earthen pots—all of them new; and having ground a large quantity of different materials, I covered all the bits of the said pots with my chemicals, laid on with a brush: but you should understand, that in two or three hundred of those pieces there were only three covered with each kind of compound. Having done this, I took all these pieces and carried them to a glass-house, in order to see whether my chemicals and compounds might not prove good when tried in a glass-furnace. Then, since these furnaces are much hotter than those of potters', the next day when I had them drawn out, I observed that some of my compounds had begun to melt; and for this cause I was still more encouraged to search for the

white enamel, upon which I had spent so much labour.

Concerning other colours I did not give myself any trouble; this little symptom, which I then perceived, caused me to work for the discovery of the said white enamel for two years beyond the time already mentioned, during which two years I did nothing but go and come between my house and the adjacent glass-houses, aiming to succeed in my intentions. God willed that when I had begun to lose my courage, and was gone for the last time to a glass-furnace, having a man with me carrying more than three hundred kinds of trial-pieces, there was one among those pieces which was melted within four hours after it had been placed in the furnace, which trial turned out white and polished in a way that caused me such joy as made me think I was become a new creature; and I thought that from that time I had the full perfection of the white enamel, but I was very far from having what I thought. This trial was a very happy one in one sense, but very unhappy in another—happy, because it gave me entrance upon the ground which I have since gained; but unhappy, because it was not made with substances in the right measure or proportion. I was so great an ass in those days, that directly I had made the said enamel, which was singularly beautiful, I set myself to make vessels of earth, although I had never understood earths; and having employed the space of seven or eight months in making the said vessels, I began to erect for myself a furnace like that of the glass-workers, which I built with more labour than I can tell; for it was requisite that I should be the mason to myself, that I should temper my own mortar, that I should draw the water with which it

was tempered; also it was requisite that I should go myself to seek the bricks and carry them upon my back, because I had no means to pay a single man for aid in this affair. I succeeded with my pots in the first baking, but when it came to the second baking, I endured suffering and labour such as no man would believe. For instead of reposing after my past toil, I was obliged to work for the space of more than a month, night and day, to grind the materials of which I had made that beautiful enamel at the glass-furnace; and when I had ground them, I covered therewith the vessels that I had made: this done, I put the fire into my furnace by two mouths, as I had seen done at the glass-houses; I also put my vessels into the furnace, to bake and melt the enamel which I had spread over them; but it was an unhappy thing for me, for though I spent six days and six nights before the said furnace, feeding it with wood incessantly through its two mouths, it was not possible to make the said enamel melt, and I was like a man in desperation. And although quite stupefied with labour, I counselled to myself, that in my enamel there might be too little of the substance which should make the others melt; and, seeing this, I began, once more, to pound and grind the before-named materials, all the time without letting my furnace cool: in this way I had double labour, to pound, grind, and maintain the fire. When I had thus compounded my enamel, I was forced to go again and purchase pots, in order to prove the said compound—seeing that I had lost all the vessels which I had made myself. And having covered the new pieces with the said enamel, I put them into the furnace, keeping the fire still at its height; but thereupon occurred to me a new misfor-

tune, which caused great mortification—namely, that the wood having failed me, I was forced to burn the palings which maintained the boundaries of my garden; which being burnt also, I was forced to burn the tables and the flooring of my house, to cause the melting of the second composition. I suffered an anguish that I cannot speak, for I was quite exhausted and dried up by the heat of the furnace,—it was more than a month since my shirt had been dry upon me. Further to console me, I was the object of mockery; and even those from whom solace was due, ran crying through the town that I was burning my floors! And in this way my credit was taken from me, and I was regarded as a madman.

Others said that I was labouring to make false money, which was a scandal under which I pined away, and slipped with bowed head through the streets, like a man put to shame: I was in debt in several places, and had two children at nurse, unable to pay the nurses; no one gave me consolation, but, on the contrary, men jested at me, saying it was right for him to die of hunger, seeing that he had left off following his trade. All these things assailed my ears when I passed through the street; but for all that there still remained some hope which encouraged and sustained me, inasmuch as the last trials had turned out tolerably well, and thereafter I thought that I knew enough to get my living, although I was far enough from that (as you will hear afterwards); and you must not be discontented if I make a rather long discourse, to make you more attentive to the matters which concern your interest.

When I had dwelt with my regrets a little because there was no one who had pity upon me, I said to my soul:

Wherefore art thou saddened, since thou hast found the object of thy search? Labour now, and the defamers will live to be ashamed. But my spirit said again: You have no means wherewith to continue this affair; how will you feed your family, and buy whatever things are requisite to pass over the four or five months which must elapse before you can enjoy the produce of your labour? Then, when I was thus seized with sorrow and debating in my spirit, hope gave me a little courage; and having considered that it would take me too long to produce a batch entirely with my own hands, and more promptly to cause to appear the secret which I had discovered of the white enamel, I took a common potter and gave him certain drawings, in order that he might make vessels in accordance with my own designs, and whilst he made these things, I occupied myself over some medallions; but this was a pitiable thing, for I was forced to maintain the said potter in a tavern upon credit, because I had no means whatever in my house. When we had laboured for the space of six months, and it was required to bake the finished work, I had to make a furnace and discharge the potter, to whom, for want of money, I was forced to give part of my clothes for wages. Then, because I had not any materials for the erection of my furnace, I began to take down that which I had built after the manner of the glass-workers, in order to use the materials again. Then, because the said furnace had been so strongly heated for six days and nights, the mortar and the brick in it were liquified and vitrified in such a manner, that in loosening the masonry I had my fingers bruised and cut in so many places that I was obliged to eat my pottage with my fingers wrapped in rags. When I had

pulled down the said furnace, it was requisite to build the other, which was not done without much difficulty; since I had to fetch for myself the water and the mortar, and the stone, without any aid, and without any repose. This done, I submitted the before-named work to the first baking, and then, by borrowing, or in other ways, I found means to obtain materials for making the enamel for the covering of the said work, which turned out well from the first baking; but when I had bought the said materials, there followed a labour for me which appeared to baffle all my wits; for after I had wearied myself, through several days, in pounding and calcining my chemicals, I had to grind them, without any aid, in a handmill which it usually required two strong men to turn: the desire that I had to succeed in my enterprise, made me do things which I should have esteemed impossible. When the said colours were ground, I covered all my vessels and medallions with the said enamel—then, having put and arranged them all within the furnace, I began to make the fire, thinking to draw out of my furnace three or four hundred livres, and continued the said fire until I had some sign and hope of my enamels being melted, and of my furnace being in good order: the next day, when I came to draw out my work, having previously removed the fire, my sorrows and distresses were so abundantly augmented that I lost all countenance; for, though my enamels were good, and my work was good, two accidents had happened to the furnace, which had spoilt all; and that you may be cautious against them, I will tell you what they were: also, after these, I will tell you a number of others, that my misfortune may to you be fortune, and my loss your gain. It

was because the mortar, of which I had built my furnace, had been full of flints, which, feeling the vehemence of the fire (at the same time that my enamels had begun to liquefy), burst into several pieces, making a variety of cracks and explosions within the said furnace. Then, because the splinters of these flints struck against my work, the enamel, which was already liquefied and converted into a glutinous matter, retained the said flints, and held them attached on all sides of my vessels and medallions, which, except for that, would have been beautiful. So, knowing that my furnace was tolerably warm, I let it cool until the next day; then I was more concerned than I can tell you, and not without cause, for my furnace cost me more than twenty-six gold dollars; I had borrowed the wood and the chemicals, and so had borrowed part of my hope of food in making the said work. I had held my creditors in hope that they would be paid out of the money which would proceed from the pieces made in the said furnace; which was the reason why several began to hasten to me after the morning when I was to commence the drawing of my batch. Yet by this means, my sorrows were redoubled: inasmuch as, in drawing the said work, I received nothing but shame and confusion; for my pieces were all bestrewn with little morsels of flint, that were attached so firmly to each vessel, and so combined with the enamel, that when one passed the hand over it, the said flints cut like razors: and although the work was in this way lost, there were still some who would buy it at a mean price; but, because that would have been a decrying and abasing of my honour, I broke in pieces the entire batch from the said furnace, and lay down in melancholy—not without

cause, for I had no longer any means to feed my family: I had nothing but reproaches in the house; in place of consolation they gave me maledictions; my neighbours, who had heard this affair, said that I was nothing but a fool, and that I might have had more than eight francs for the things that I had broken; and all this talk was brought to mingle with my grief.

When I had remained some time upon the bed, and had considered within myself, that if a man should fall into a pit, his duty would be to endeavour to get out again; I, being in like case, set myself to make some paintings, and in various ways I took pains to recover a little money; then I said within myself, that my losses and hazards were all past, and there was no longer anything to hinder me from making good pieces; and I betook myself (as before) to labour in the same art. But in heating another furnace there occurred an accident of which I had not thought; for the vehemence of the flame of fire had carried a quantity of ashes against my pieces; so that in those parts which had been touched by the ashes, my vessels were rough and ill-polished; because the enamel, being liquefied, had united with the said ashes. In spite of all these losses, I remained in hope of remounting in fortune by means of the said art; for I caused to be made, by certain potters, a large number of earthen lanterns, to contain my vessels when I put them in the furnace; in order that, by means of the said lanterns, my vessels might be protected from the ash. The invention proved a good one, and has served me to the present day. But having guarded against risk from ashes, other faults and accidents occurred; as, when I had made a batch, it might prove to be too much baked, or another time too little,

and all would be lost in that way. I was so inexperienced, that I could not discern the too much, or too little. One time my work was baked in front, but not baked properly behind; another time I tried to obviate that, and burnt my work behind, but the front was not baked at all; sometimes it was baked on the right hand, and burnt on the left; sometimes my enamels were put on too thinly, sometimes they were too thick, which caused me great losses; sometimes, when I had in the furnace enamels different in colour, some were burnt before the others had been melted. In short, I blundered for the space of fifteen or sixteen years. When I had learnt to guard against one danger, there came another about which I had not thought. During this time I made several furnaces, which caused me great losses before I understood the way to heat them equally. At last I found means to make several vessels of different enamels intermixed in the manner of jasper. That fed me for several years; but, while feeding upon these things, I sought always to work onward with expenses and disbursements—as you know that I am doing still. When I had discovered how to make my rustic pieces,* I was in greater trouble and vexation than before: for having made a certain number of rustic basins, and having put them to bake, my enamels turned out some beautiful and well melted, others ill melted; others were burnt, because they were composed of different materials, that were fusible in different degrees—the green of the lizards was burnt before the colour of the serpents was melted; and the colour of

* Small models of the wild animals, reptiles, &c., of the country, were these "rustic" pieces, coloured after nature. Rustic basins were the bowls or plates, about which they were introduced as ornaments.

the serpents, lobsters, tortoises, and crabs, was melted before the white had attained any beauty. All these defects caused me such labour and heaviness of spirit, that before I could render my enamels fusible at the same degree of heat, I thought I should be at the door of my sepulchre. Also, while labouring at such affairs, I was, for the space of ten years, so wasted in my person, that there was no form nor prominence of muscle on my arms or legs; also the said legs were throughout of one size, so that the garters with which I tied my stockings, were at once, when I walked, down upon my heels, with the stockings too. I often walked about the fields of Xaintes considering my miseries and weariness, and, above all things, that in my own house I could have no peace, nor do anything that was considered good. I was despised and mocked by all; nevertheless, I always made some vessels of different colours, which kept house tolerably; but, in doing this, the diversities of earth, with which I thought to forward myself, brought me more loss in a little time than all the accidents before. For having made several vessels of different earths, some were burnt before the others were baked; some received the enamel, and proved afterwards extremely suited to my purpose; others deceived me in all my enterprises. Then, because my enamels did not work well together on the same thing, I was deceived many times; whence I derived always vexation and sorrow. Nevertheless, the hope that I had caused me to proceed with my work so like a man, that often, to amuse people who came to see me, I did my best to laugh, although within me all was very sad.

I pursued my affairs in such a manner that I received a

good deal of work from one part of my business, which succeeded well; but I had another affliction, allied with the before-named, which was that the heat, the cold, the winds, and rains, and droppings, spoilt the largest portion of my work before I baked it; so that I was obliged to borrow carpentry, laths, tiles, and nails to make shift with. Then, very often having nothing wherewith to build, I was obliged to make shift with green boughs and sticks. Then again, when my means augmented, I undid what I had done, and built a little better; which caused some artisans, as hosiers, shoemakers, sergeants, and notaries, a knot of old women—all those, without regarding that my art could not be exercised without much space, said that I did nothing but boggle, and blamed me for that which should have touched their pity, since I was forced to use things necessary for my house to build the conveniences which my art required; and what is worse, the incitement to the said mockeries proceeded from those of my own house, who would have had me work without appliances—a thing more than unreasonable. Then the more the matter was unreasonable, the more extreme was my affliction. I have been for several years, when, without the means of covering my furnaces, I was every night at the mercy of the rains and winds, without receiving any help, aid or consolation, except from the owls that screeched on one side, and the dogs that howled upon the other; sometimes there would arise winds and storms, which blew in such a manner up and down my furnaces that I was constrained to quit the whole with loss of my labour, and several times have found that having quitted all, and having nothing dry upon me because of the rains which had fallen, I would go to bed at midnight or near

dawn, dressed like a man who has been dragged through all the puddles in the town, and turning thus to retire, I would walk rolling, without a candle, falling to one side and the other like a man drunk with wine, filled with great sorrows, inasmuch as having laboured long I saw my labour wasted; then, retiring in this manner soiled and drenched, I have found in my chamber a second persecution worse than the first, which causes me to marvel now that I was not consumed with suffering.

THEORY.—Why do you make me out so long a tale? It is rather to divert me from my intention than to assist it. You have given me an excellent discourse upon the accidents which happen in the art of pottery, but that is of no use unless to scare me, for of the enamels you have told me nothing yet.

PRACTICE.—The enamels which I use are made of tin, lead, iron, steel, antimony, sapphire of copper, sand, the herb glass-wort, ashes of tartar, litharge, stone of Perigord.* Those are the materials proper for the making of my enamels.

THEORY.—But see, now, when you tell me that, you tell me nothing; for I have already found from your statements that you lost much before you mixed the enamels in a right proportion; therefore, you know very well that if you do not give me the proportions, I shall not know what to do with my knowledge of the materials.

PRACTICE.—The errors I committed in mixing the proportions of my enamels, gave me knowledge of more than of what things were not suitable. Therefore I am of opinion that you should work to find the said proportions, as I have done; otherwise you will have

* Manganese.

science too cheap, and perhaps that may cause you to despise it: for I know well, that there are no people in the world who give easy bargains of their mysteries and their arts, excepting those who got them at almost no cost; but they who have practised them through great expense and toil, do not part with them so lightly.

THEORY.—You would have me regard these things as wonderfully excellent. If it were some great science, of which we were in great need, you might then preach its excellence; but you esteem so highly a mechanical art, which can be easily dispensed with.

PRACTICE.—That is a statement out of which I now perceive that you are unworthy to hear anything of the mystery of the said art; and since you call it a mechanical art, you shall know no more of it by my means. It is well known that in the said art there are some parts mechanical, as the kneading of the earth; there are some branches of it which produce vessels for the ordinary service of the kitchen, without any exact form or measure: they may be called mechanical; but forasmuch as concerns the government of the fire, it ought not to be compared with anything mechanical. For you must know, that to manage properly a batch of work, especially when it is enamelled, the fire must be regulated by a philosophy so careful, that there is no wit so fine as to find no labour in it and avoid being frequently deceived. As for the manner of arrangement in the furnace, it requires a peculiar geometry.

Item.—You know that there are made in several places earthen vessels, which are adjusted in so geometrical a way, that a great vessel is supported on a little foot, even while yet the clay is soft: do you call that mechanical? Do you not know that measuring by the compass ought

not to be called mechanical, for being very common, or because the workmen so engaged are poor? Nevertheless, the arts which require compass, rules, numbers, weights and measures, ought not to be called mechanical. And since you will thus rank as mechanical the art of treating earth, and scarcely esteem its utility, I will now make you understand how it is greater than I am able to explain. Consider a little, how many arts would be useless, if not altogether lost, without the art of treating earth. The refiners of gold and silver must cease from their work, for they could do nothing without furnaces and earthen vessels; inasmuch as no stone or other matter could be found, which might serve to contain melting metals, if there were no vessels of earth.

Item.—The glass-workers must cease from their work; for they have no means of melting the ingredients of their glass, if not in vessels of earth. The goldsmiths, founders, all melting of whatever sort or kind it may be, would be at an end, and there would not one be found who could dispense with clay. Look also at the forges of the farriers and locksmiths, and you will see that all the said forges are made of bricks; for if they were of stone, they would be soon consumed. Look at all the furnaces, you will find they are made of earth; even those who labour upon earths use earthen furnaces, as tilers, brick-makers, and potters: in short, there is no stone, mineral, or other matter, which could serve for the building of a furnace for glass, lime, or any of the before-named purposes, which would last for any length of time. You see also how useful common earthen vessels are to the community, you see also how great is the utility of earth for the covering of houses. You know

that in many regions they know nothing of slate, and have no other covering than tiles: how great do you suppose to be the utility of earth in making conduits from our fountains? It is well known that the water which flows through earthen pipes is much better and wholesomer than that which has been brought through leaden channels. How many towns are there, think you, built of bricks, inasmuch as there were no means of getting stone to build them with? How, think you, did our ancestors estimate the usefulness of the art of treating earth?

It is well known that the Egyptians and other nations have caused many sumptuous buildings to be constructed by the art of treating earth: there have been several emperors and kings, who have caused to be built great pyramids of earth, in order to perpetuate their memory; and some of them have done this, fearing that their pyramids would be crumbled by fire, if they had been of stone. Then, knowing that fire was powerless against the buildings of baked earth, they had them built of bricks; witness the children of Israel, who were marvellously oppressed while making bricks for the said buildings. If I would put in writing all the uses of the art of treating earths, I never should have done; wherefore I leave you to think within yourself the remainder of its uses. As for its reputation, if it be now despised, it has not always been so. Historians certify to us, that when the art of treating earth was invented, vessels of marble, alabaster, chalcedony, and jasper, were cast into contempt; that even many earthen vessels were consecrated to the service of the temples.

THE POTTER'S CLAY.

BETWEEN the different kinds of argillaceous earths there is so great a difference, the one from the other, that it is impossible for any man to be able to relate the contrariety that is among them. Some are sandy, white and very thin, and for these reasons a great fire is needed before they are baked properly. Such kind of earth is very good for making crucibles, because it endures a very great fire; there are other earths which, on account of the metallic substances that are in them, bend and liquefy when they endure great heat. I have seen some tilers' furnaces of which the arches were in such sort liquefied, that the vaults were quite full of pendant forms, as you see the icicles from the gutters of the houses during frosts. There are other kinds, which, when they are baked, whether in pottery or in bricks, it is needful that the master of the work take good heed, in drawing his affair from the furnace, lest it take cold; and what is more, those who work with it are constrained to stop all the vent-holes of their furnace as soon as their batch is baked, because if it felt the very slightest wind in cooling, the pieces

would all turn out cracked. There is a kind at Savigny, in Beauvoisis, which I think has not in France its like; for it endures a marvellous fire, without being at all injured, and has this advantage also, that it allows itself to be shaped more slenderly and delicately than any of the others; and when it is extremely baked, it takes a little vitrificative polish, which proceeds from its own substance; and that causes that the vessels made with the said earth hold water quite as well as glass vessels. There are other kinds of earth which are black in their essence, and when they are baked they are white like paper; other kinds are yellow, and when they are baked they become red. There are some kinds which are of evil nature; because among them there are little stones, which when the vessels are baked, the little stones which are in the said vessels are reduced to lime, and suddenly when they come to feel the humidity of the air, they swell and cause the said vessel to split in the place where they are enclosed, and this is because the said stones were calcined in the baking; and by this means many vessels are lost, however great the labour one may have employed upon them. There are other kinds of earth which are very good, and very well endure the fire; but they are so vain and lax that one cannot make any light vessels of them, because when one would form them a little high, it sinks down towards the bottom, not being able to sustain itself.

It is a general rule, that all argillaceous earths, and especially the finest, are subject to crackle at the fire before they are baked; for this reason, those who work with them are obliged to add to the fire little by little, in order to chase the moisture which is in the work; so

that if the pieces which one bakes are thick, and there are many of them, it will be necessary to maintain the fire sometimes three or four days and nights; and if the work has once begun to heat, and he who shall conduct the fire do fall asleep, and suffer his work to cool before it be baked in perfection, there is no help but the work is lost. And by such accident many potters have had great losses.

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I once saw certain modellers of images, instructed in the art of treating earth by hearsay only, and sufficiently new in the knowledge of earths, who, after having made some images, put them into the furnaces to bake them, according to their understanding. But when they began to put on the large fire, it was a pleasant thing enough (though not a cause of laughter to us all) to hear these images burst, and make a battery between themselves like a multitude of harquebusades and discharges of cannon, and the poor master very vexed, like one who had been robbed of his purse; for the day being come for drawing the images out of the furnace, the furnace was no sooner opened than he saw some with cracked heads, others with shattered arms and the legs broken; so that the poor man, having drawn his images, was much disturbed, and had trouble enough to find the pieces; for some were as small as flies, and not being able to get them together, he was often obliged to make knobs for flags and other matters out of the said images.

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Once I had collected some of the earth of Poitou, and had laboured upon this for the full space of six months before I had my batch complete; because the vessels that I had

made were very elaborate, and of a somewhat high price. Now, in making the said vessels of the earth of Poitou, I made some of them of the earth of Xaintonge, on which I had worked for some years before, and was sufficiently experienced in the degree of the fire, which was needed by the said earth, and thinking that all earths might bake at a like degree. I baked my work which was earth of Poitou among that of earth of Xaintonge, which caused me a great loss; inasmuch as the work in earth of Xaintonge being baked sufficiently, I thought that the other work would be so too: but when I came to enamel my vessels, those feeling the moisture, it was an unpleasant joke for me; because as many pieces as were enamelled came to dissolve and fall to pieces, as a limestone would do soaked in water; and at the same time, the vessels of the earth of Xaintonge were baked in the same furnace, and at the same degree of heat as the above named, and turned out very well. You see, then, how a man who labours in the art of earth is always an apprentice, because of the unknown nature of the diversities of earth.

THE NATURALIST LOOKING OUT ON EVIL DAYS.*

Question.—Truly you have given me a good account, and a sad one; where do you think to find a place convenient for your design? Would you be fool enough to incur such great expense, for the mere sake of a fine garden?

Answer.—I have told you, upon this point, that there will be found in France more than four thousand granges or noble mansions, near which are fulfilled the conditions necessary for the erection of the before-named garden, and of this there can be no doubt; and as for the expense, which you pronounce to be excessive, you will find more than a thousand gardens in France which have cost more than mine would cost; and then do you regard the cost that is to bring you such delight, and a revenue of laudations?

Question.—Good; but one might have greater pleasure, and would do better, to buy good horses and good armour, to attain some rank and charge in the military art, and then, in traversing the country, many would appear before you to make gifts of lodging, food, and furniture. One man would be giving you a mule, an-

* Palissy, having sketched in a dialogue his idea of a delectable garden, continues as above.

other man a horse, which would come to you at no more cost than the whistling; and so you would get much more pleasure than could be afforded by your garden. Also you might chance to catch a benefice, which you could cause to be held by some cook of a priest, and you would finger the revenues; for I know many who by such means, having purchased their estate of Seneschal of the Long Robe, have come to hold the estate of Seneschal of the Short Robe,* which has been the way in which they have become esteemed and honoured, feared and dreaded. And by such means their purses have been filled with booty; and even in these late troubles you know how some of these men have received large presents for granting favour to the Huguenots, who spared nothing to save their lives, which were closely sought after.

Answer.—The reasons you allege are wicked and unseasonable. You know well that I told you from the first how I would build my garden, to serve me as a city of refuge, a place of retirement in these perilous and evil days; and that I would do this to fly from the iniquity and malice of the world, to serve God with pure freedom; and now you come and tempt me with execrable avarice and evil invention.

And do you think that if a man has bought an office of Seneschal, whether long-robed or short-robed, and has done this through avarice or ambition, that in so doing he becomes a man well off? I know well that some have been the buyers of such greatness, in order that they might be feared, and satisfy their vengeance, and

* Seneschal of the Long Robe was chief of a subaltern court of justice. Seneschal of the Short Robe was first officer of justice in a province.

that they might swell their purses out with presents. Is it therefore to be said that such men are well off? Greatly do they fall short of that.

You know well that Saint Paul says nothing is more vile than the avaricious man. *Item*, it is well known that in many passages of Holy Scripture, it is forbidden to the judges to take gifts, because by gifts the judgment is corrupted; and so I may conclude that there is nothing good in the advice you give me. *Item*, you have told me that if I had bought any authority, whether office of Seneschal or any other, that I might fish up some benefice that I could cause to be held by a cook or a priest.

You advise me then to commit wickedness, simony, and theft, and you know that the revenue of the benefices ought not to be given except to those who will faithfully administer the word of God; and as for others who enjoy themselves on the revenue, they are accursed, damned, and lost. And I can tell you this with certainty, because it is written in the Prophet Ezekiel, chap. 34; for the prophet says, "Woe be to you, shepherds, who eat the fat and clothe you with the wool, and leave my flock scattered upon the mountains; I will require it at your hands."

Is that not a sentence at which these simoniacs should tremble? And in truth, they cause the troubles which we suffer at this day in France; for if they did not fear to lose their Church revenue, they would grant easily enough all other points of Holy Writ. But I can easily judge, by their way of acting, that they have more love and greater reverence for their own bellies, than for the divine majesty of God, before which they will have to give account at the day of his coming; and then they

shall desire to die, and death will flee from them; and they will say then to the mountains, Mountains, fall upon us, and hide us from the face of this great living God, as it is written in the Apocalypse.

See, therefore, now, whether you have given me good counsel, or advised me rather to my ruin.

Item.—Do you think that these poor wretches have any peace in their own conscience? I venture to say that they and their accomplices, whoever they may be, have always some remorse in their consciences, and that they fear more to die than they who have not had the conscience cauterized; at all events they are not satisfied with either wealth or honour; but if any one should cross them, they will break their hearts to be revenged; and so the poor wretches have no peace, whether in their minds or in their bodies, however fat a kitchen they afford to keep.

For these causes, I have found nothing better than to fly the neighbourhood and the acquaintance of such people, and to withdraw myself to labour on the earth, which is a thing just before God, and a great recreation to those who will contemplate admiringly the wondrous works of Nature. But I have found in the world no pleasure greater than to have a beautiful garden. So God having created the earth for man's service, placed him in a garden which contained several kinds of fruit; and it was for this reason that, contemplating the sense of the 104th Psalm, as I told you before, I was seized formerly with so great an affection for the building of my said garden, that since that time I have done nothing but toil over again, within myself, the building of the same; and often, in sleeping, I have seemed to be about it, as it happened to me last week, that when I was

asleep upon my bed, my garden seemed to be already made, and in the same form that I have described to you, and I already began to eat its fruits, and recreate myself therein; and it seemed to me that walking, in the morning, through the said garden, I came to consider the marvellous deeds which the Sovereign has commanded Nature to perform; and among other things I contemplated the branches of the vines, of peas, and gourds, which seemed as though they had some sense of their weak nature; for being unable to sustain themselves, they stretched certain little arms like threads into the air, and finding some small branch or twig, came to unite and attach themselves, never again to part thence, that they might sustain the parts of their weak nature.

And sometimes, in passing through the garden, I saw a number of the said branches which had nothing whereby to support themselves, and threw their little arms into the air, thinking to grasp something, to sustain a part of their said body; then I came to present to them certain boughs and branches, to aid their weak nature, and having done this in the morning, I found in the evening that the above-named things had cast and entwined many of their arms about the said boughs; then, all astonished at the providence of God, I came to contemplate an authority, which is Saint Matthew, where the Lord says that even the birds shall not fall to the ground without His will. And having passed on farther, I perceived certain branches and creepers of the hop-plant, which, though it has neither sight, nor hearing, nor perception, nevertheless has received knowledge from God of the weakness of its nature, and the way in which it should sustain itself, in such manner that

I saw that the said creepers of the said hop bound and entwined many together, and being thus fortified by the companionship of one another, they spread themselves along the length of certain branches, in order to consolidate themselves again together, and attach themselves to the said branches; when I had seen and contemplated such a thing, I could find nothing better than to employ oneself in the art of agriculture, and to glorify God, and to recognise Him in His marvels. And having passed still farther, I perceived certain fruit-trees, which seemed also as if they had some understanding; for they were careful to preserve their fruits, as is the woman for her little child: and among others I perceived the vine, the cucumbers, and melons, which had made for themselves certain leaves with which they covered their fruits, fearing lest they might be injured by the heat. I saw also the rose-trees and the gooseberries, which, for the purpose of repelling those who would deprive them of their fruits, had put on an armour of sharp spines about the said fruit. I perceived also the wheat and other grain, to which the Sovereign had given wisdom for the clothing of their fruit. so excellently, that Solomon with all his wisdom never wore so suitable a vesture.

I considered also, that the Sovereign had taught the chestnut to arm and clothe its fruit industriously with a wondrous robe, likewise the filbert, the almond, and many other kinds of fruit-trees; which things occasioned me to fall upon my face, and adore the Living of Living, who has made such things for man's use and service. Then, also, that gave me occasion to consider our miserable ingratitude and perverse wickedness; and the more I entered into the contemplation of these things,

the more I was led by my affections to the art of agriculture, and led to despise these grandeurs and dishonest gains which, at the last, have to be recompensed according to their merits or demerits. And being in such ravishment of spirit, it seemed to me that I was really in the said garden, and that I tasted all the pleasures it contained—not those of the garden only, but of its aspects and surrounding places: for it seemed within me really as if I left the garden to walk in the meadow lying to the south of it, and being there, that I could see play, frisk, and bound, certain lambs, rams, ewes, she-goats, and kids, kicking and skipping, with many strange looks and gestures; and at the same time it seemed to me that I was taking great pleasure in the sight of certain old and decayed ewes, which, feeling their time renewed, and having put off their old robes, were making a thousand leaps and gambols in the said meadow, which was a thing full of pleasure and refreshment.

It seemed to me, also, that I beheld certain rams, which retreated far from one another, and then running with speed and a great stiffness, they came to strike their horns together. I saw also the goats, which, rising on their two hind feet, struck horns together with great violence; also, I saw the little colts and the little calves, which played and pranced near their mothers. All these things gave me so great a pleasure, that I said in myself that men were very foolish so to despise rural places and the art of agriculture, which our ancient fathers, men of might and prophets, were content themselves to exercise, and even to watch the flocks.

It seemed to me, also, that to recreate myself, I walked along the avenues, and under the cover of their foliage

I heard for awhile murmuring the waters of a brook which passed at the foot of the said avenues, and on the other side I heard the voice of the young birds which were upon the trees; and then there came into my memory that hundred and fourth Psalm on which my garden had been founded, where the prophet says: "He sendeth the springs into the valleys, which run among the hills:" also he says, "By them shall the fowls of the heaven have their habitation, which sing among the branches."

It seemed to me, also, that when I was tired of walking in the said meadows, I turned towards the side of the west wind, where the woods and mountains are; and then it seemed to me, that I perceived many things which are deduced and narrated in the said Psalm: for I saw the conies playing, jumping, and bounding along the mountains near to certain pits, holes, and habitations, which the Sovereign Architect had erected for them; and when suddenly the animals perceived one of their enemies, they knew well how to retire into the place which was ordained to be their dwelling.

I saw also the fox, who crept along the thickets, his belly against the earth, to catch some one of those little creatures, to content the desire of his belly. In short, it seemed to me that I had the pleasures of beholding goats, deer, hinds, and kid, along the said mountains, in the same sort, or very near to the way which the Prophet David describes to us in this hundred and fourth Psalm.

Item.—It was to me as if I heard the voice of many virgins who kept their flocks; in like wise it seemed to me that I heard certain shepherds playing melodiously on their flageolets: and then it seemed to me that I said within myself, I marvel at a heap of foolish labourers, who from

the moment that they have acquired a little wealth, which they will have gained with much labour in their youth, are afterwards ashamed to train their children in the state of labourers; so they will make them, on the first occasion, greater than themselves, placing them in professions commonly, and what the poor man will have been earning with great pains and labour, he will in great part spend to make his son a gentleman, which gentleman, at last, will blush to be seen in his father's company, and be displeased if any one shall say he is son to a labourer. And if, by chance, the good man has certain other children, it will be this gentleman who will eat up the rest, and will have the best share, without regard to the expense incurred for him at the schools, while his brothers were cultivating the earth with their father. And, meanwhile, behold the reason why the earth frequently miscarries under evil management; because the misfortune is such that every man asks only to live upon his income, and to leave the cultivation of the earth to the most ignorant—a deplorable thing.

Would that it were so, I said then, that men could have as great zeal, and as much affection for labour upon the earth, as they have affection for the purchase of offices, benefices, and grandeurs; and then would the earth be blessed, and the labour also of her cultivators, and then she would produce her fruits in her season.

Having contemplated all these things, I went to walk towards the side of the east wind, and in walking under the fruit-trees, I received a great contentment and many joyous pleasures; for I saw the squirrels gathering the fruits, and leaping from branch to branch, with many pretty looks and gestures. On the other hand, I

saw nuts gathered by the rooks, who rejoiced in taking their repast, and dining on the said nuts. Again, under the apple-trees I found certain hedgehogs, which had rolled themselves into a round form, and having thrust their little hairs or needles over the said apples, went so burdened.

I saw also the wisdom of the fox, who, finding himself persecuted by fleas, took a mouthful of moss into his mouth, and went to a brook, and having turned his back towards the said brook, he entered little by little, in order to cause all the fleas to escape from his body towards his head; and when they had all fled into his head, the fox immersed himself still by degrees, until they were all gathered on his snout; and when they were upon his snout, he slowly immersed that, until they were collected on the moss which he had taken in his mouth; and when they were upon the moss, he left it, diving suddenly, and came up at a place higher up the stream; and so he left the fleas upon the said moss, which moss served to them as a boat to carry them elsewhere.

I perceived, also, a stratagem which the fox used in my presence, the most acute and subtle that I ever heard related: for he found himself destitute of food, and seeing that it was near dinner-time, and that he yet had nothing ready, he went to lie down in a field close by, and adjoining one end of the wood; and having lain down there, he stretched his limbs upwards, and shut his eyes, and being thus stretched upside down, pretending to be dead*: * * then it happened that a

* I spoil this passage by omitting its most interesting part, in deference to what we call, in England, delicacy. When our minds come to be less coarse, perhaps our delicacy will not be so comprehensive as it is at present.

crow, also in want of dinner, came to place herself upon his belly, thinking that the said fox was dead: * * * but the crow was well outwitted; for at the first blow of her beak * * * the fox griped the crow, who could find no help for herself but to cry coïa: and in that way the subtle fox obtained his dinner, at the cost of her who would have eaten him. All these things have made me such a lover of the fields, that it seems to me that there are no treasures in the world so precious, or which ought to be held in such great esteem, as the little branches of trees and plants, although they are the most despised. I hold them in more esteem than mines of gold and silver. And when I consider the value of the very smallest branch of tree or thorn, I am filled with wonder at the great ignorance of men, who seem, in our day, to study only how to break through, cut down, and destroy the beautiful forests which their predecessors had been guarding as so precious. I should not find it wrong in them to cut the forests down, if afterwards they planted any portion of the soil; but they think not at all of times to come, not considering the great harm they are doing to their children in the future.

Question.—And why do you find it so wrong that forests should be cut down in this manner? There are many bishops, cardinals, priories, and abbeys, monasteries and chapters, which, in cutting forests down, have obtained treble profit. First, they have had money for the wood, and have given some of it to women, children, and men also. *Item*, they have leased the soil of the said forests at a rental, out of which they have reaped much money also in entrance-fees. And afterwards the labourers have sown wheat and seeds every year, of

which wheat they have had always a good portion. You see, therefore, how much more income lands yield than formerly they yielded. For which reason I cannot think that this ought to be found wrong.

Answer.—I cannot enough detest such a thing, and can call it not a fault, but a curse and a misfortune to all France; because when all the woods shall have been levelled, there must be an end of all the arts, and artisans may go and browse on herb, like Nebuchadnezzar. I have sometimes attempted to put down in order the arts that would cease, if there came to be an end of wood; but when I had written a great number of them, I could see no way to an end of my writing; and having considered all, I found that there was not a single one which could be exercised without wood: that all navigation and all fisheries must cease, and that even the birds and several kinds of beasts, which nourish themselves upon fruits, must migrate to another kingdom, and that neither oxen, cows, nor any other bovine animals, would be of service in a country where there was no wood. I had studied to give you a thousand reasons; but this is a philosophy which, when the outside waiters shall have thought about it, they will judge, that without wood it is impossible to exercise any art; and it would even be necessary, if we had no wood, for the office of the teeth to become vacant, and where there is no wood there is no need of wheat nor any other grain for making bread.

I think it a very strange thing that many seigneurs do not compel their subjects to sow some part of their land with acorns, and other parts with chestnuts, and other parts with filberts, which would be a public good, and a revenue that would grow while they were sleeping.

That would be very fit in many parts where they are constrained to amass the excrement of oxen and cows to warm themselves; and in other regions they are obliged to warm themselves and boil their pots with straw: is not this a fault and public ignorance?* If I were seigneur of such lands, so barren of wood, I would compel my tenants to sow trees in at least a part of them. They are much to be pitied: it is a revenue which would come to them while sleeping; and after they had eaten the fruits of the trees, they could be warmed by their branches and their trunks.

I praise greatly an Italian duke, who, some days after his wife had given birth to a daughter, philosophized within himself that wood gave a revenue which grew while one was asleep; therefore, he commanded his servants to plant about his lands a hundred thousand feet with trees, saying thus, that the said trees would be worth twenty sols a-piece before his daughter was of age to marry, and so the said trees would be worth a hundred thousand livres, which was the dowry he projected giving to his daughter. That was a prudence greatly to be praised; I would that many could be found in France who would act in the same manner. There are many here who love the pleasure of the chase, and the frequenting of the woods; but at the same time they take to themselves what they find, without concerning themselves for the future.

Many devour their income as retainers of the court in hectorings, superfluous expenses, as well in accoutrements as in other things: it would be much more useful for them to eat onions with their tenants, and teach

* A hundred and fifty odd years after this was written, it was ordered (May 3, 1720) that trees of all kinds, fitted in each place to the nature of the soil, should be planted throughout France on the borders of the public roads.

them how to live well, set them good example, adjust their disputes, hinder them from ruining themselves with lawsuits, plant, build, trench, feed, sustain, and, at the requisite and necessary time, hold themselves ready to do service to their prince for the defending of their country.

I wonder at the ignorance of men, when I look at their agricultural implements, which ought to be in more request than precious bits of armour: yet for all that, it seems to certain striplings, that if they had handled any implement of agriculture, they would have been dishonoured by it; and a gentleman, however poor he may be, and up to his ears in debt, would be debased in his own eyes if his hands had been for a short time in contact with a plough.

I could wish that the king had founded certain offices, estates, and honours for all those who should invent some good and subtle agricultural tool. If it were so, everybody's mind would have been bent on achieving something. Ingenious men were never in demand at the siege of a town but there were found a few; and precisely as you see men despise the ancient modes of dress, they would despise also the ancient implements of agriculture, and in good sooth they would invent better ones.

Armourers often change the fashion of the halberds, swords, and other harness; but the ignorance in agriculture is so great that it abides ever accustomed to one method; and if the tools were clumsy at their first invention, they preserve them ever in their clumsiness: in one province, one accustomed fashion without any change; in another province, another also without ever changing.

It is not long since I was in the province of Bearn and of

Bigorre; but in passing through the fields, I could not look at the labourers without chafing within myself, seeing the clumsiness of their implements: and why is it that we find no well-born youth, who studies as much to invent tools useful to his labourers, as he takes pains over the cutting of his coat into surprising patterns? I cannot contain myself to talk of these things, considering the folly and the ignorance of men.

Question.—What tools would it require to build such a garden as you have just now described to me?

Answer.—There would be need of all kinds of tools, servants to agriculture; and, because there are columns and other pieces of architecture, there would be need of all kinds of tools proper to geometry.

Question.—I beg you to name these to me in order, as they succeed each other.

Answer.—We have the compass, the rule, the square, the plummet, the level, the bevel, and the astrolabe. Those are the tools necessary to geometry and architecture.

Since we are talking of geometry, let me say, that it occurred to me last week, being asleep about the hour of midnight, to see my geometrical tools in rebellion, one against another, and questioning to which of them belonged to the honour to walk first; and being in this debate, the Compass said: "That honour belongs to me; for it is I who manage and measure everything: also, when one wishes to reprove a man for his superfluous expenditure, he is admonished to live more within compass. So to me belongs the honour of going first." The Rule said to the Compass: "You do not know what you talk about. You can make nothing but a circle; but as for me, I guide all things in a direct way, and

forwards or sideways, or whatever way it be, I cause everything to walk straight before me: also, when a man lives in an ill manner, they say that his life is irregular; which is as much as to say, that without rule he cannot live rightly. Therefore, to me belongs the honour of walking foremost."

Then the Square said: "It is to me that this honour belongs; for when need is, two Rules exist in me: also, it is I who manage the angles and the chief stones of the corner, without which, no building would hold together." Then the Plummet lifted itself up, saying: "I ought to be honoured above you all; for it is I who lead and guide all masonry directly heavenwards, and without me no wall would be straight, for which cause buildings would fall suddenly: also, I often do the office of a Rule; therefore you have to conclude, that to me the place of honour belongs."

This done, the Level rose and said: "Oh, the scoundrels and rascals! it is to me that the place of honour belongs. Do not people know that all the rafters, girders, cross-beams, could not be put to their duty without me? Do not people very well know that I manage all places and pavements as I please? Do not people very well know that many ingenious men have made use of my services in making their mines, trenches, and in pointing their wild cannons? and that without me they could not gain their ends? That is why you must break off and conclude that the due honour ought to rest with me."

And immediately after the Level had finished his discourse, there was the Bevel, who leapt up with great quickness, saying: "Make way, make way; you do not know what you are saying: the place of honour appertains to me; for I do deeds that none of you can

do: and I ask you, could you erect a building on a sloping place? And it is well known that you cannot; and you are of no use, and can do nothing but the commonest sort of business: but for me, I go, I come, I make a little thing, I make a great thing,—in short, I do things that none of you can do. Therefore, it is easy to decide that the place of honour belongs to me."

Then the Astrolabe arose, with a canonical firmness and gravity, and spoke thus: "Would you rob me of the honour that is due? For it is I who mount up higher than you all, great as you may be, and my kingdom and empire stretches to the clouds. Is it not I who measure the stars, and through me that the times and seasons are made known to men, fertility or sterility? And what have you to say to this? Can any one deny the truth of that which I affirm?" And when I heard the noise of their disputes, I aroused myself, and straightway came to see what it might be: then the moment they had seen me, they straightway elected me their judge, to judge upon their cause of quarrel: whereupon I said to them, Do not deceive yourselves, there belongs to you no honour, neither any pre-eminence: honour belongs to man, by whom you have been formed; and for that reason you must serve and honour him.

"What," they said, "to man! and must we obey and serve man, who is so wicked and full of folly:" then I endeavoured to excuse man, saying that it was not so. They all cried out, saying: Give us leave to measure the head of man, and do you make use of us in this affair, and you will know that man has not a straight line in him, nor certain measure in any part of him, whatever Vitruvius and Sebastian, and other architects, may

have said and demonstrated by their figures. Seeing which, I was seized with a desire to measure the head of a man, to know exactly what his measures were, and it seemed to me that the Bevel, the Rule, and the Compass, were very proper for this business; but, however it might be, I could never find a certain measure, because the follies which were in the said head caused it to change its measures.

Then I was confused, because I found the said head, now of one sort, now of another; and although it presented, occasionally, some appearance of right lines, yet when I applied my tools to figure them, suddenly, and in a moment, I found that the right lines had become oblique; at which I was much astonished, seeing that there was not any right line in a man's head; because his folly caused every right line to deviate and to become oblique. Then I wished to know what manner of follies were in man, which made him to be so deformed and disproportioned; but being unable to know or learn this by geometry, I determined to examine it by an alchemical philosophy, which was the way in which I came suddenly to erect sundry furnaces, proper for this business: some to putrefy, others to calcine; some to examine, others to sublime in; some again for the purpose of distilling.

Which done, I took the head of a man, and having extracted its essence by calcinations and distillations, sublimations, and other examinations made by means of retorts, flasks, and sand-baths, and having separated all terrestrial parts from the exhalative matter, I found that there were truly in man an infinite number of follies, which, when I had perceived, I fell back, as it were, fainting, in consequence of the great exhalation of follies

out of the said head. Then I was taken with a sudden curiosity, and longing to know what was the cause of its great follies, and having closely examined my affair, I found that avarice and ambition had turned almost all men foolish, and had, after a manner, rotted all the brain: when I had ascertained this, I was more desirous to investigate the roguish tricks of men than I had been before, which was the reason why I took the head of a Limosin, and having subjected it to examination, I found that he had his head full of follies, and was a great mixer and augmenter of drugs; so that it was detected that he had bought good pepper in Rochelle at thirty-five sols the pound, and sold it afterwards at seventeen sols, in the fair of Niord, making a great profit in consequence of the adulteration added to the said pepper.

Then I asked why he was so foolish, and without judgment, as to deceive thus wickedly the customers; but without any shame this rascal maintained that the folly of which he was guilty was a piece of wisdom: and I urged upon him then that he was damning himself, and that he could afford better to be poor than damned; but this insensate said that poor men were of no esteem, and that he would not be poor, follow what might: then I was constrained to leave him in his folly.

Afterwards I grasped the head of a young man, without having regard to what might be his condition; and having put his head under examination, I found that the chief part of this was only folly; and having contemplated for a little while this personage, I entered into a dispute with him, inquiring of him, "Brother, who has moved you to cut in this way the good cloth you are wearing in your breeches and other habiliments? Do you not know very well that it is a folly?" But

this insensate wished to make me believe that breeches so cut would last longer than others, a thing I could not believe.

Then I said to him, "My friend, assure yourself of this, and do not doubt it, that the first man who had holes cut in his breeches was a fool by nature; and though, in general matters, you may be the wisest person in the world, yet in this particular you imitate and follow the example of a fool. True it is, that a folly transmitted from our ancestors is esteemed wisdom; but for my part, I cannot agree that such a thing is not a direct piece of folly."

After this I seized me the head of a dirty wife of a king's officer, that is to say, of the long robe, and having exposed it to examination, and having separated the spirit from the earth, I found the above named closely packed with follies in her head; then, thinking to do the duty of a Christian, I said to her, "My dear lady, why is it that you are so perverse in your habiliments? Do you not know very well that clothes are only made in summer to cover the flesh, and in winter for the same reason, and for protection against cold? And you know that the closer to the skin your garments are, the more they retain heat, and the better they serve the ends of modesty; but, on the contrary, you have got to yourself a farthingale, in order to dilate your dress in such a manner, that your garments barely escape exposing what you ought to hide." After I had made her this remonstrance, instead of thanking me, the silly woman called me Huguenot;* seeing which, I left

* The origin of the word "Huguenot" is a vexed question. Some call it a corruption of the German *Eid-genossen* (sworn associates). This notion is first cousin to Minshew's derivation of Haberdasher from the German *Habt ihr das* (have you that).

her and took up her husband's head, and having examined it as usual, I found in it great follies and knaveries; then I said to him, Why is it that you are so foolish, to trick and pillage people on all sides? He told me that it was for the maintenance of his estate, and that he could have no peace with his wife if he did not often give her new equipments, and that he was forced to rob in order to maintain his estate and condition. "O fool," I said then, "is your wife to bring you an apple of death, as did the wife of our first father? It would have been better if you had been married to a shepherd-girl; your wife will not excuse you when you shall be obliged to stand before the judgment-seat of God."

After that I took the head of a canon, and having made examination of its parts as above, I found that there was more folly in it than in all the others. I asked him then, "Why is it that you are so great an enemy to those who speak of the authority of Holy Writ?" But he replying said, that if it were not that he should be forced to preach in all his benefices, he would take part with the Protestants; but since he had not learned to preach, and was accustomed from his youth to live at ease, that caused him to support the Church of Rome. And I said then, "You are very wicked, and you play the hypocrite before your brothers the other canons, who think that you both maintain and believe honestly the statutes of the Roman Church." "No, no," he said, "there is not one of my companions who would not confess the truth, if they had no fear of losing their revenues; and if it were not for that, there is no man of them who would not eat meat with me in Lent; and whatever appearance they assume, they only go to mass

for the edification of the kitchen, there is not a doubt of that. If it had not been that the good folks would compel us to go and preach, we could have endured the ministers quietly enough; but for our income's sake, we do our best towards their banishment."

Then I thought that it would be folly in me to attempt to admonish him, considering the answer he had made. Then, to know whether his speech had truth in it, I grasped the head of a president of the chapter; but that was terrible, for it would not endure the test, nor permit that any examination should be made of its affairs: he kicked, he beat, he pranced, he plunged into a black, vindictive choler. Seeing which, I became vexed at him; and, whether he liked it or no, I placed him under examination, and proceeded to separate his parts —that is to say, the black, pernicious choler on one hand, ambition and vain-glory on the other. I put aside, elsewhere, the intestine murder which he used against them that he hated; in short, I thus separated all his parts, as a good alchemist separates the matter of his metals, and asked him: "Will you not cease from your follies? Is it not time to be converted?" "What," he said, "follies? There is no man in this parish wiser than I am. I belong," he said, "to the new religion, when I please, and understand truth as well as any other; but I am wise—I walk in the way of my own time, and do service to those I love, and vengeance on those I hate." "Certainly," I said, "but that is not a Christian life; for we know that the priests ought not to live lewdly." "What, lewd?" said he. "It is true that I have a wife and many children, but she is not lewd—she is my wife —we two were married secretly." And I said to him: "Wherefore, then, do you persecute and seek the death

of Christians?" "What, death?" he said. "I have saved many of them. It is true, that those whom I hated, I have not forborne to follow." Whatever I could say or do, by no means could I make this president agree that he was not a good and a wise man, however many were the marvellous evils in his parts which I had put under examination.

After this I took the head of a presiding judge, who called himself good servant to the king—the same had greatly persecuted certain Christians, and had favoured many wicked men; and, having subjected his head to examination, and separated its parts, I found that there was one part fattened by a morsel of benefice which he possessed; then I knew directly that this was the reason why he had made war against the Gospel, or against those who desired to lay it open to the light. Seeing which, I left him to his folly, knowing well that I should have had no power of argument over him, since his kitchen was fattened with that kind of pottage.

Then I came to examine the head and the whole body of a counsellor of parliament—the slyest fellow one might ever meet with—and having put his parts into the retort and furnace of examination, I found that he had in his belly many bits of benefices, which had fattened him so much that he could not confine his belly in his breeches. When I had perceived such a thing, I entered into dispute with him, saying to him: "Come, now, are you not foolish? Is it not thus that the profits of your benefices have caused you to take proceedings against Christians? Confess by this that you are a foolish man; I say, more foolish than Esau, who gave up his birthright for a mess of herbs: he gave no more than a temporal good, but you give an eternal kingdom,

and take upon yourself eternal penalties for the pleasure and delectation of your belly. Confess, therefore, that your folly is, beyond comparison, greater than that of Esau. Esau deplored his error, yet he was not heard. I do not mean to say by that, that if you confess your iniquity you will not be pardoned; but I have great fear that you will do nothing while you war directly against the truth of God, of which you are not ignorant."

I had no sooner finished my discourse, than this foolish and insensate man used all his efforts to put me to shame, and gain a victory upon the proposition that I had maintained; and said to me with a loud voice: "What, is that your argument? If I were, indeed, a fool for holding benefices, the number of fools would be terribly great." Then I said to him, quite gently, that all those who drink the milk and wear the wool of the sheep, without providing for their pasture, are accursed; and alleged to him the passage that is written in Jeremiah the Prophet, chapter 34. Then he attempted a bravado, and a marvellously high-flown fury, saying, "What? According to your account, there are a great many whom God has cursed? For I know that in our sovereign court, and in all the courts of France, there are few counsellors and presidents who do not possess some morsel of benefice, which helps to support the gildings and accoutrements, banquets, and common pleasures of the house,—necessary to acquire in time some noble place, or office, of more honour and authority. Do you call that folly? It is the most consummate wisdom," said he. "It is a great folly to let oneself be hung, or burnt, for the maintenance of the authorities of the Bible. *Item*," said he: "I know that

there are many great lords in France, who take the revenue of benefices; nevertheless, they are not fools, but very wise; for such things help them greatly in the maintenance of their estates, honours, and fat kitchens; and, by such means, they get good horses for their service during war."

When I had heard the discourse of this miserable simoniac, inveterate in his roguery, I was quite confounded, and cried out in my spirit, lifting up my eyes on high and saying: O poor Christians, and what place is yours? You thought to abase idolatry, and to have gained friends to your cause; I know now that you were not on the road to that; for if I may believe this counsellor, you have all the courts of parliament against you; and if it be as he has told me, you have also many great lords who take profit of the revenue of benefices; and while they are intoxicate with such a potion, you must fain know that they will always be your capital and mortal enemies. Therefore, I am of opinion that you should return to your old simplicity, assuring yourselves that you will have enemies, and be persecuted all the time of your life, if by direct paths you will follow and sustain the cause of God; for such are the promises written originally in the Old and New Testament. Take refuge, then, under the shelter of your protecting chief and captain, our Lord Jesus Christ, who in time and place will know how properly to avenge the wrong that he has suffered, and your sorrows.

HISTORY OF THE TROUBLES IN XAINTONGE.

After I had perceived the follies and rogueries of men, and considered the horrible emotions and wars which have

this year pervaded the whole kingdom of France, I thought within myself to make the design of some town or city of refuge, in which to retire in time of wars and troubles, and evade the malice of many horrible and insensate plunderers, whom I have before now seen in the execution of their furious rage against a great multitude of families, without having regard to just or unjust cause, and even without any commission or commandment.

Question.—It seems to me, when I hear you talk, that you do not feel assured of the peace which it has pleased God to send us, and that you have still some fear of a popular outbreak.

Answer.—I pray God that it will please Him to give us His peace; but if you had seen the horrible excesses of men that I have seen during these troubles, you have not a hair in your head that would not have trembled, at the fear of falling to the mercy of man's malice. And he who has not seen these things, could never think how great and horrible a persecution is.

I do not wonder that the Prophet David preferred rather to choose pestilence than famine and war, saying that if he suffered plague, he was at the mercy of God, but that in war he was at the mercy of men; for which cause God extended his rod over his people, and not over him, because he had submitted himself to divine mercy, and made plain confession of his fault. For that reason, I can assure you that it is a thing horribly to fear, the falling under the mercy of men who are wicked and pernicious.

Question.—I pray you to tell me how arose this division in this district of Xaintonge; for it seems to me that it would be well to set it down in writing, in order that

it might remain as a perpetual memorial for the use of those who shall come after us.

Answer.—You know that there will be many historians who will employ themselves upon this matter: at all events, the better to describe the truth, I should think it well that in each town there should be persons deputed to write faithfully the deeds that have been done during these troubles; and from such materials the truth might be reduced into a volume; and for this cause I am about to give you a short narrative, not of the whole, but of a part of the commencement of the Reformed Church.

You must understand, that just as the Primitive Church was built upon a very small beginning, and with many perils, dangers and great tribulations, so, in these last days, the difficulty and dangers, pains, labour, and afflictions, have been great in this region of Xaintonge. I say of Xaintonge, because I will leave the inhabitants of any other diocese to write of it themselves, that which they truly know.

It happened, in the year 1546, that certain monks having spent some days in parts of Germany, or, it may be, having read some books of their doctrine, and finding themselves deceived, they had the boldness secretly enough to disclose certain abuses; but as soon as the priests and holders of benefices understood that these people depreciated their trade, they incited the judges to descend upon them: this the judges did with an exceedingly good will, because several of them possessed some morsel of benefice which helped to boil the pot. By this means, some of the said monks were constrained to take flight, to exile and unfrock themselves, fearing lest they might die in too hot a bed. Some took to a

trade; others kept village schools; and because the isles of Olleron, of Marepnes, and of Allevert, are remote from the public roads, a certain number of the said monks withdrew into those islands, having found sundry means of living without being known. And as they visited people, they ventured to speak only with hidden meaning, until they were well assured that they were not to be betrayed. And after that by this means they had reformed some number of persons, they found means to obtain the pulpit, because in those days there was a grand vicar who tacitly favoured them: thence it followed that by little and little, in these districts and islands of Xaintonge, many had their eyes opened, and knew many errors of which they had before been ignorant; for which cause many held in great estimation the said preachers, inasmuch as but for them they would view their errors poorly enough.

There was in those days a man named Collardeau, fiscal attorney, a man perverse and of evil life, who found means to give notice to the Bishop of Xaintes, who was at the time at court, giving him to understand that the place was full of Lutherans; and that he gave him charge and commission to extirpate them, and not only wrote to him many times, but also transported himself to the said spot. He succeeded so well by these means that he obtained a commission from the bishop and from the parliament of Bourdeaux, with a good sum of deniers that were taxed to him by the said court. This he contrived for gain, and not through zeal on behalf of religion. This done, he tampered with certain judges, as well in the island of Olleron as of Allevert, and likewise at Gimosac; and having corrupted these judges, he caused the arrest of the preacher of St. Denis, which

is at the end of the island of Olleron, named Brother Robin, and by the same means caused him to be passed into the island of Allevert, where he arrested another preacher named Nicole; and some days afterwards he took also the brother at Gimosac, who kept a school and preached on Sundays, being much beloved of the inhabitants. And although I believe the story to be written in the "Book of Martyrs," yet, nevertheless, because I know the truth of certain facts, I have found it well to write them, namely, that they well disputed and maintained their religion in the presence of one Navieres, theologian, canon of Xaintes, who had himself formerly begun to detect errors, however much, because he had been conquered by his belly, he maintained the contrary, as the poor captives well knew to reproach him to his face. However that might be, these poor folk were condemned to be degraded and caparisoned in green, in order that the people might esteem them fools or madmen; and what is more, because they maintained manfully the cause of God, they were bridled like horses by the said Collardeau, before being led upon the scaffold, which bridles had to each an apple of iron which filled all the inside of the mouth—a very hideous thing to see; and being thus degraded, they restored them into prison to conduct them to Bourdeaux, in order that they might be condemned to death. But between the two condemnations there occurred an admirable accident, namely, that he to whom most evil was desired, and whom it was designed to put to death with the most cruelty, was the man who escaped them, and quitted the prisons by an admirable means; for, to have care of him, they had stationed a certain person on the steps of an entry near the prisons, to listen for any

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sign of outbreak; also, they had procured great village dogs, which a grand vicar had brought, which were set at large in the bishop's court, in order that they might bark if any prisoner attempted to come out. In spite of all these things, Brother Robin filed the irons which he had upon his legs, and having filed them, he gave the files to his companions, and this done, he pierced the walls, which were of good masonry. But there occurred a strange accident, which was, that by chance a number of hogsheads were piled one upon another before the said wall, which hogsheads being pushed down, created a great noise; for which cause the porter rose, and having listened a long while, returned to sleep. And so the said Brother Robin went out into the court, at the mercy of the dogs. However, God had inspired him to take some bread, and when he was in the court he threw it to the said dogs, who were quiet as the lions of Daniel. Now, it must be noted, that the said Robin had never been in this town of Xaintes, for this cause being in the bishop's court, he was still shut up; but God willed that he should find an open door which led into the garden, which he entered, and finding himself again shut up between certain somewhat high walls, he perceived by the light of the moon a certain pear-tree which was close enough to the said wall, and having mounted the said pear-tree, he perceived on the other side of the said wall a chimney, to which he could leap easily enough. Seeing which, he went back to the prisons, to know whether any one of his companions had filed his irons; but seeing that they had not, he consoled and exhorted them to battle manfully, and to take patiently their death; and embracing them, took leave of them, and went again to

mount upon the pear-tree, and thence leapt upon the chimneys of the street. But this was a very marvellous thing, proceeding from the divine Providence, how the said Robin could escape the second danger; for, because he never had been in the town, he knew not to whom he should retire. But because he had been sick with a pleurisy when in the prisons, and there had been provided for him a physician and apothecary, the said Robin ran through the streets inquiring for the said physician and apothecary, of whom he had remembered the names. But in doing this he went to knock at several doors belonging to his greatest enemies, and among others at the door of a counsellor, who employed all diligence next morning to get news of him, and promised fifty dollars on the part of the grand vicar, named Sellière, to him by whose means the said Robin should be taken. He then, knocking at doors in the hour of midnight, had excellently provided for his occasion, for he had fastened up his dress over his shoulders, and had fastened his fetters to one of his legs, and by such means those who came to the windows thought that it was a footman. He managed so well that he found refuge in a house, and was from thence in the same hour conducted out of the town, which occurred in the month of August in the said year; but those two companions were burnt, one in the town of Xaintes, and the other at Libourne, because the parliament of Bourdeaux had fled thither by reason of the plague, which was then in the town of Bourdeaux; and the above-named martyrs, Nicole and his companions, died in the month of August, in the year 1546, enduring death with a great constancy.

The bishop, or his counsellors, resolved in those times on

a trick and stratagem extremely subtle; for having obtained some order from the king for the cutting down of a great number of forests which were around this town, nevertheless, because many found their recreation in the woods and pastures of the said forest, they would not permit that they should be levelled; but those following the Mahometan artifices resolved to gain the heart of the people by preachings and presents made to the king's party, and sent into this town of Xaintes, and other towns of the diocese, certain monks of the Sorbonne, who foamed, slavered, twisted and twirled themselves, making strange gesture and grimaces, and all their discourses were nothing but outcry against these new Christians; and sometimes they exalted their bishop, saying that he was descended from the precious blood of Monseigneur St. Louis;* and in this way the poor people patiently allowed their woods to be cut down; and the woods having been thus cut, there were no more preachers. Thus you see how the possessions of people were practised upon as well as their souls.

By this you may easily judge what could be the state of the Reformed Church, which had not yet any appearance of a Church, otherwise than that there were some who tacitly and timidly complained against the Papacy. It was some time afterwards, in the year 1557, when one

* Bishop of Xaintes, in 1544, was Charles Cardinal of Bourbon; Archbishop of Rouen, Legate of Avignon, afterwards Bishop of Beauvais, Peer of France, Commander of the Order of the Holy Spirit. As Palissy would say, to boil his pot he had some benefices. He was Abbot of St. Denis, Abbot of St. Germain des Prez, Abbot of St. Ouen, Abbot of Jumièges, Abbot of Corbie, Abbot of Vendôme, Abbot of la Couture, Abbot of Signy, Abbot of Orcamp, Abbot of Montebourg, Abbot of Valemont, Abbot of Perseigne, Abbot of St. Germer, Abbot of Châteliers, Abbot of Froidmont, Abbot of St. Etienne, in Dijon; Abbot of St. Lucien, in Beauvais; Abbot of St. Michael, in Lerm; *&c., &c.*

named Master Philibert Hamelin, who had been formerly a prisoner in this town, and taken by the same Collardeau, transported himself again into this town of Xaintes; and, because he had dwelt at Geneva for some time since his imprisonment, and having enlarged at the said Geneva both his faith and doctrine, he had always a remorse of conscience, because he had dissembled in his public confession in this town; and wishing to repair his fault, he exerted himself, wherever he went, to incite men to have ministers, and to erect some kind of church, and so travelled through the lands of France, having some servants who sold Bibles, and other books printed in his press. For he had given his mind to it, and made himself a printer. In doing this, he passed sometimes through this town, and went also to Allevert. Now, he was so just and of so great a zeal, that although he was a man ill capable of walking, he would never accept horses, although many urged him so to do with full affection. And being slenderly provided as to the wherewith, he took with him no other outfit than only a simple staff in his hand, and went his way alone, in this manner, without any fear.

Now, it occurred one day, after he had concluded some prayers and little exhortations in this town—having at most seven or eight auditors—he went upon his way to Allevert, and, before parting, he prayed the little flock of the assembly to congregate themselves, to pray, and to exhort one another; and so he went to Allevert, labouring to win the people to God; and there, being received kindly by the chief part of the people, brought them by the sound of a bell to certain sermons, and baptized a child. Seeing which, the magistrates of this town constrained the bishop to produce money for the

maintenance of a pursuit of the said Philibert, with horses, gens-d'armes, cooks, and sutlers. The bishop, and certain magistrates of this town, transferred themselves to the island of Allevert, where they caused the child to be re-baptized who had been baptized by the said Philibert; and not being able to catch him there, they followed on his track, until they had found him in the mansion of a gentleman; and so they brought him into this town, as a malefactor to the criminals' prisons, although his works give certain witness that he was a child of God, and truly of His chosen. He was so perfect in his works that his enemies were compelled to own that he was of a holy life, always without approval of his doctrine.

I am full of wonder that men should have dared to sit in judgment of death over him, seeing that they knew well and had heard his blameless conversation; for I am assured, and I can say with truth, that after the time when he was brought into the prisons of Xaintes, I mustered hardihood (although the days were perilous in those times) to go and remonstrate with six of the principal judges and magistrates of this town of Xaintes, that they had imprisoned a prophet or an angel of God, sent to announce his word and judgment of condemnation to men in the last days; assuring them that for eleven years I had known the said Philibert Hamelin to be of so holy a life, that it seemed to me as if the other men were devils when compared to him. It is certain that the judges used humanity towards myself, and heard me kindly: also I spoke to each of them in his own house. Finally, they treated with tolerable kindness the said Master Philibert, although they could not acquit themselves of being guilty of his

death. True it is that they did not kill him, as Pilate and Judas did not kill the Lord; but they delivered him into the hands of those by whom they knew well that he would be slain. And the better to come by a wash for their hands that would acquit their hearts, they reasoned that he had been priest in the Roman Church; therefore they sent him to Bourdeaux, with good and sure guard, by a provost-marshal.

Would you know how holy was the life of the said Philibert? Liberty was given to him to live in the apartment of the gaol-keeper, and to eat and drink at his table; which he did while he was in this town. But after, for many days, he had laboured and taken pains to repress the gamblings and the blasphemies which were committed in the chamber of the gaol-keeper, it was so displeasing, seeing that they would not check themselves, that to prevent himself from listening to such evil, as soon as he had dined he caused himself to be led into a criminal cell, and remained there the whole day long in solitude, to avoid the evil company.

Item.—Would you know still better how he walked uprightly? To him, being in prison, there came an advocate of France, belonging to some region in which he had founded a little church, which advocate brought three hundred livres, which he offered to the gaol-keeper, provided he would, at night, put the said Philibert outside the prisons. Seeing which, the gaol-keeper was almost incited to do it; he requested, however, to take counsel with the said Master Philibert, who answering, told him: "that it was better worth his while to die at the hands of the executioner, than to expose another man to evil for the good of self." Which learning, the said advocate took back his money. I

ask you, which is he among us who would do the like, being at the mercy of enemies as he was? The judges of this town knew well that his life was holy; nevertheless, they acted through fear, lest they should lose their offices: so we must understand it.

I was well informed, that while the said Philibert was in the prisons of this town, there was a person, who, speaking of the said Philibert, said to a counsellor of Bourdeaux: "They will bring you, one of these days, a prisoner from Xaintes, who will speak to you well, messieurs." But the counsellor, blaspheming the name of God, swore that he should not speak to him at all, and that he should take care not to be present at his judgment. I ask you whether this counsellor called himself a Christian, who would not condemn the just? At any rate, since he was constituted judge, he will have no excuse; for while he knew that the other was a good man, he ought with his power to have opposed the judgment of those, who through ignorance, or through malice, condemned him, delivered him up, and caused him to be hung like a thief, the 18th of April, in the abovenamed year.

Some time before the arrest of the said Philibert, there was in this town a certain artisan, marvellously poor and indigent, who had so great a desire for the advancement of the Gospel, that he demonstrated it every day to another as poor as himself, and with as little learning, for they both knew scarcely anything: nevertheless, the first urged upon the other that if he would employ himself in making some form of exhortation, that would be productive of great fruit. And as the second felt himself to be totally destitute of learning, that gave him courage; and some days afterwards he assembled,

one Sunday in the morning, nine or ten persons, and because he was ill versed in letters, he had taken some passage from the Old and New Testament, having them put down in writing. And when they were assembled, he read to them the passages and texts, saying: "That each man, according to the gifts he had received, should distribute them to others; and that every tree which bore not fruit, would be cut down and cast into the fire." Also he read another text taken from Deuteronomy, where it is written: "Thou shall declare my words, when thou sittest in thine house, and when thou walkest by the way, when thou liest down, and when thou riseth up; and thou shalt write them on the door-posts of thine house, and on the gates." He proposed to them, also, the Parable of the Talents, and a great number of such texts; and this he did tending towards two good ends: the first was to show, that it was the duty of all people to speak of the statutes and ordinances of God, and that his doctrine might not be despised on account of his own abject state. The second end was to incite certain auditors to do as he was doing; for in this same hour they agreed together that six from among them should make exhortations weekly—that is to say, each of the six once in six weeks, on Sundays only. And because they undertook a business in which they had never been instructed, it was said that they should put their exhortations down in writing, and read them before the assembly. Now all these things were done by the good example, counsel, and doctrine of Master Philibert Hamelin. That was the beginning of the Reformed Church of the town of Xaintes.

I am sure that there was, at the beginning, such a congre-

gation that the number was of five alone; and while the church was so little, and the said Master Philibert was in prison, there arrived in this town a minister named De la Place, who had been sent to go and preach in Allevert. But on the same day, the attorney of the said Allevert happened to be in this town, who assured him that he would be very unwelcome there, on account of that baptism which Master Philibert had performed, because several assistants thereat had been condemned to very heavy penalties, and it was for this reason that we prayed the said De la Place to administer to us the word of God; and he was received for our minister, and remained until we had Monsieur de la Boissiere, which is he whom we still have at the present time. But this was a pitiable thing, for we had the goodwill, but the power to support the ministers we had not; inasmuch as La Place, during the time that we had him, was maintained partly at the expense of the gentlemen, who frequently invited him. But fearing lest that might not be the means of corrupting our ministers, they advised M. de la Boissiere not to leave the town, except with permission, to attend upon the nobility, even though it might be upon urgent business. By such means, the poor man was shut up like a prisoner, and very frequently ate apples, and drank water for his dinner; and for want of tablecloth, he very often laid his dinner on a shirt, because there were very few rich people who joined our congregation, and so we had not the means of paying him his salary.

In that way our church was established: in the beginning, by despised folk; and when its enemies arrived to waste and persecute it, it had so well prospered in a few

years, that already the games, dances, ballads, banquets, and superfluities of head-dress and gildings, had almost all ceased: there were almost no more scandalous words, or murders. Actions at law were beginning greatly to diminish; for so soon as two men of our religion began an action, means were found to bring them to accommodation, and even, very often, before commencing any suit, one man did not begin to proceed against another until first he had caused him to be reasoned with by members of the Church. When the time came for Easter preparations, many engaged in hatreds, dissensions, and quarrels, were reconciled. The question was not only about psalms, prayers, canticles, and spiritual songs, any more than it was only a quarrel against dissolute and lewd songs. The Church had so well prospered, that even the magistrates had assumed the control of many evil things which were dependent upon their authority. It was forbidden to inn-keepers to have gaming in their houses, or to give meat and drink to people who inhabited houses in the town, in order that the debauched men might be returned to their families. You would have seen in those days, on a Sunday, fellow-tradesmen rambling through the fields, groves, and other pleasant places, singing in troops, psalms, canticles, and spiritual songs, reading, and instructing one another.

You would have seen the daughters and virgins seated by troops in the gardens, and other places, who, in a like way, delighted themselves in the singing of all holy things. On the other hand, you would have seen the teachers, who had so well instructed youth, that the children had even no longer a puerility of manner, but a look of manly fortitude. These things had so well

prospered that people had changed their old manners, even to their very countenances.

The Church was established in the beginning with great difficulty and eminent perils; we were blamed and vituperated with perverse and wicked calumnies. Some said, If their doctrine were good, they would preach it publicly. Others said, that we assembled out of lewdness, and that at our assemblies women were common. Others said, that we went to kiss the tail of the devil with the candle of rosin. Notwithstanding all these things, God so well favoured our affair, that although our assemblies were most frequently held in the depth of midnight, and our enemies very often heard us passing through the street, yet so it was, that God bridled them in such manner that we were preserved under His protection. And when God willed that His Church was manifested publicly, and in the face of day, he fulfilled in our town an admirable work; for there were sent to Toulouse two of the principal chiefs, who would not have permitted our assemblies to be public, which was the reason why we had the hardihood to take the market-hall. That we could not possibly have done without great scandal, if the said chiefs had been in the town. And this would have been so; for you cannot affirm that, since those troubles, they have been otherwise than totally bent on checking, ruining, and annihilating, engulfing, and thrusting into an abyss the little skiff of the Reformed Church.

By that, I can judge easily that God detained them for the space of two years, or thereabout, at Toulouse, in order that they might not hurt His Church, during the time that He would have it to be manifested publicly.

Though the Church had great enemies, nevertheless she flourished in such a manner in few years, that even the enemies of the same, to their very great regret, were constrained to speak well of our ministers; and particularly of Monsieur de la Boissiere, because his life rebuked them, and gave good witness of his doctrine. Now, certain priests began to take part in the assemblies, to study, and take counsel about the Church; but when any one of the Church was guilty of some fault, or wrong, to any one of the adversaries, they were very prompt to say: "Your minister has never counselled you to do this evil." And so the enemies of the Gospel had the mouth shut; and, though they held the ministers in hatred, they dared not malign them, because of their good life.

In those days the priests and monks were blamed in common talk—that is to say, by enemies of the religion, and they said thus: "The ministers make prayers, which we cannot deny to be good. Why is it that you do not make the like?" Which seeing, monsieur, the theologian of the chapter, betook himself to making prayers like the ministers; so did the monks, who were paid salaries for preaching: for if there was a shrewd brother, awkward customer, and subtle argumentator among the monks in the whole country, he must be had in the cathedral church. Thus it happened, that, in those days, there was prayer in the town of Xaintes every day, from one side or the other.

Do you wish to know how the Roman ecclesiastics made the said prayers, through hyprocrisy and malice? Observe a little: they make no more of them now, nor did they make any before the coming of the ministers. Is it not easy to judge, that what they did in that respect

was only for the sake of saying: "I know how to do that as well as others?" However that may be, the Church prospered so well then, that the fruits of the same will endure for ever. And those who hope that they shall see the Church beaten down and annihilated, they will be confounded. For since God insured its safety then, when there were but three or four despised folk, how much more He will have care to-day of a great number? I do not doubt that she will be tormented; upon that we ought all to be well assured, since it is written; but that will not be according to the desire and measure of her enemies. Several village-people in those days demanded ministers of their rectors, or farmers, of the Church, or otherwise declared that they would pay no tithes: this worried the priests more than any other thing, and appeared to them very strange.

In those days, deeds were done worthy enough to make one laugh and weep at the same time; for certain farmers, hostile to the religion, seeing these new events, betook themselves to the ministers to pray that they would come and exhort the people of the district which they farmed, and this in order that they might be paid their tithes. I never looked so merry, though I wept the while, when I heard say that the attorney, who was criminal-notary when suits were brought against those of the religion, had himself made the prayers, a little while before the devastation of the church in the parish of which he was farmer. It is to be decided whether, when he himself made the prayers, he was a better Christian than when he made out the indictment against those of the religion: certes, he was as good a Christian when he made out the indictment, as he was when he made the prayers, provided that he

made them only to get out of the labourers their corn and fruits.

The fruit of our little church had so well prospered, that they had constrained the wicked to become good; nevertheless, their hypocrisy has been since then amply made manifest and known: for when they had licence to do evil, they have shown outwardly what they kept hidden in their wretched breasts. They have done deeds so wretched that I have horror in the mere remembrance, at the time when they rose to disperse, engulf, ruin, and destroy those of the Reformed Church. To avoid their horrible and execrable tyrannies, I withdrew myself into the secret recesses of my house, that I might not behold the murders, cursings, and indecent deeds which were done in our rural glades; and being thus withdrawn into my house for the space of two months, I had warning that hell was loose, and that all the spirits of the devils had come into the town of Xaintes: for where I had heard a little while before psalms, canticles, and all honest words of edification and of good example, I heard only blasphemies, blows, menaces, tumults, all miserable words, dissoluteness, lewd and detestable songs; in such wise, that it seemed to me as if all virtue and holiness on earth had been smothered and extinguished: for there issued certain imps out of the Château of Taillebourg, who did more ill than the demons of antiquity. They, entering the town, accompanied by certain priests, with naked sword in hand, cried, "Where are they?" They must cut throats immediately; and so they did to those who walked abroad, well knowing that there was no resistance; for those of the Reformed Church had all disappeared. In any case to find evil, they took a Parisian in the

streets, who was reported to have money; they killed him without meeting any resistance, and exercising their accustomed trade, reduced him to his shirt before life was extinct. After that, they went from house to house, to seize, sack, gluttonise, laugh, jest, and make joy with all dissolute deeds and blasphemous words against God and man; and they did not content themselves with jesting against man, but also they jested at God; for they said, that Agimus had beaten the Eternal Father.

In that day there were certain persons in the prisons, to whom the pages of the canons, when they passed before the said prisons, said, jesting, "The Lord will help you;" and they said to them again, "now say, 'Avenge me, espouse my cause.'" And some others, beating with a stick, said, "The Lord be merciful to you." I was greatly terrified for the space of two months, seeing that the linkboys and blackguards had become masters at the expense of those of the Reformed Church. I had nothing every day but reports of frightful crimes that from day to day were committed; and it was of all those things the one that grieved me most within myself, that certain little children of the town, who came daily to assemble in an open space near the spot where I was hidden (exerting myself always to produce some work of my art), dividing themselves into two parties, and casting stones one side against the other, swore and blasphemed in the most execrable language that ever man could utter; for they said, by the blood, death, head, double-head, triple-head, and blasphemies so horrible that I have, as it were, horror in writing them. Now, that lasted a long while, while neither fathers nor mothers exercised over them any rule. Often I was

seized with a desire to risk my life by going out to punish them; but I said in my heart the seventy-ninth Psalm, which begins, "O God, the heathen are come into thine inheritance." I know that many historians will describe these things more at length; nevertheless, I have desired to say thus much by the way, because, during the evil days, there were very few members of the Reformed Church in this town.

A STUDY IN FORTIFICATION.

SOME time after I had considered the horrible dangers of war, from which God had marvellously delivered me, I was seized with a desire to design and draw the plan of some town, wherein one might be secure in time of war; but considering the furious batteries of which men now make use, I was almost out of hope, and went every day with my head bowed, fearing lest I should look at something which should cause me to forget the things of which I desired to think; for my mind leapt now to one town, and now to another, labouring to recollect the strong points of those, and to know whether I might partly make use of the plan of these, to serve my design. But I found in all these a manner of construction very contrary to my opinion; for the inhabitants, in fortifying them, divide the houses which adjoin the walls from the defences of the town, and make great walks between the houses and the said walls; and that they say to be necessary for doing battle, defending and drawing along all kinds of engines and artillery; but I found also that this served towards

the killing of a great many men, and I have never been able to persuade my mind that such an invention was good, and assure myself that if, at the time when columns were invented, artillery had held sway as it does at present, that our ancient builders never would have built the towns with separation of the houses from the walls. And why? In time of peace the walls are useless, however great the treasure and the toil that may have been employed upon them.

Having then considered these things, I found that the said towns could in no case serve me for a copy, seeing that when the walls are overcome, the town is forced to a surrender. Truly that is but a poor body of a town when the members cannot consolidate and aid each other. In short, all such towns are ill designed as long as the members are not concatenated with the main body. It is very easy to beat down the body, if the members render no assistance. Seeing which, I put aside my hope of taking any copy from the towns that are built at present; so I transported my mind to contemplation of the pictures of compartments and other figures which have been made by Master Jacques du Cerseau and several other designers. I looked also at the plans and figures of Vitruvius and Sebastian, and other architects, to see whether I could find in their pictures anything which might serve me for the invention of the said fortified town; but never was it possible for me to find any picture which could aid me in this affair.

Which seeing, I walked like a man absent in mind, the head bowed, without saluting or regarding anybody, because of my interest which was engaged on behalf of the said town. And walking thus, visiting all the most

excellent gardens which it was possible for me to find (and this, in order to see whether there might be some form of the labyrinth invented by Dædalus, or some flower-bed, which might give hint for my design), it was not possible for me to find anything that could content my mind.

Then I began to wander through the woods, mountains, and valleys, to see whether I could find some industrious animal which had built some house of industry: seeking which, I saw a very great number of them, which caused me to be quite astonished at the great industry that God had given to them; and among others, I was full of marvel at a fortress which the loriot had made for the protection of its little ones; for the said fortress was suspended in the air, by an admirable industry: at the same time, I found no profit there for my affair.

I saw also, a young snail, which built its house and fortress of its own saliva; and this it did, little by little, during many days: for, having taken the said snail, I found that the edge of its building was still liquid, and the remainder hard, and knew then, that some time was needed for the hardening of the saliva with which it built its fort. Then I took great occasion to glorify God in all his marvels, and found this might give some little aid to me in my affair: at the least, it encouraged me, and held me in hope that I should succeed in my design. Then, joyous enough, I walked hither and thither, to one side and to another, to see whether I could further obtain some lesson from the buildings of animals; which lasted for the space of several months, during which time, I always exercised my art as potter, to support my family.

After I had remained for many days in this debate of

mind, I bethought myself of visiting the shore and rocks of the great ocean, where I perceived so many diverse kinds of dwellings and fortresses, which certain little fish had made with their own liquor and saliva, that from that time I began to think that I might find there something good for my affair. Then I began to contemplate the industry of all these kinds of fish, to learn something of them, beginning from the largest to the least: I found things which made me all abashed, because of the marvellous Divine Providence which had bestowed such care upon these creatures; so that I found in those of least esteem, that God had bestowed upon them greater industry than on the others: for thinking to find some great industry and excellent wisdom in the large fishes, I found in them nothing industrious, which caused me to consider that they were well enough armed, feared, and dreaded because of their greatness, and that they had not need of other armour; but as for the weak, I found that God had given to them industry to know how to construct fortresses marvellously excellent against the designs of their enemies. I perceived also, that the battles and stratagems of the sea were, without comparison, greater in the said animals than those of earth; and saw that the luxury of the sea was greater than that of the earth, and that, without comparison, it produced more fruit.

Having then taken strong desire to contemplate these things from close at hand, I took note that there was an infinite number of fishes which were so weak in their nature, that there was in them no appearance of life, except a form of slimy liquor; as are the oysters, the mussels, the heart-shells, the cockles, the limpets,

and an infinite number of winkles of different kinds and sizes.

All those abovenamed fishes are weak, as I have said before: but what? Behold now an admirable thing, which is, that God has had so great care for them, that he has given to them industry to know how to make, each for himself, a house, constructed and smoothed by such a system of geometry and architecture, that never Solomon in all his wisdom could have made the like, and if even all human intellects could be assembled into one, they would not know how to produce the faintest trace of it.

When I had contemplated all these things, I fell upon my face, and in adoring God, began to cry out in my spirit, saying: "O thou good God! I can now say, like the Prophet David, thy servant, 'And what is man, that Thou rememberest him?' and that even Thou shouldst have made all things for his service and comfort? At the same time, Lord, he is not ashamed to lift up himself against Thee, to destroy and do away with those whom Thou hast sent upon the earth, to announce thy justice and judgment to men. O thou good God! and who shall he be who will not marvel at Thy wondrous patience? How long will Thou leave here to suffer and endure, the Prophets and the chosen whom Thou hast placed at the mercy of those who cease not to torment them?" This done, I walked upon the rocks, to contemplate more closely the excellent marvels of God; and having found certain limpets, which are called otherwise goat's-eyes, I perceived that they were armed with a great industry; for having but one shell upon the back, they attached themselves over

the rocks, in such a manner, that I think there is no fish in the sea, however furious, which would be able to tear it from the said rock. And when one wishes to tear off the said fish, which is only slime, or a hardened liquor, if one fails to tear it off at the first trial, by putting a knife between the rock and it, it will come to clasp and join itself so closely to the rock, that it is not any longer possible to tear it off; which is an admirable thing, seeing the weakness of its nature. The hourmeau, and several other kinds, attach themselves in a like way; for, otherwise, their enemies would soon devour them.

Is not this also an admirable thing of the sea-urchin? which, because its shell is so weak, God has given to it means of knowing how to make many sharp spines upon its corslet or fortress; so that when it is attached upon its rock, one cannot take it without pricking one's-self. Is it not an admirable thing to see the fishes which have two shells? If you consider the cockles and the heart-shells, and many other kinds, you will find an industry such that it will give you occasion to abase your pride. Have you ever seen a thing made by the hand of man, which could fit so accurately as do the two shells and armour of the said heart-shells and cockles? Certes, it is impossible to men to do the like. Do you think that those little concavities and nervations, which are in the said shells, have been made only for ornament and beauty? No, no, there is something more: that augments in such sort the strength of the said fortress, as certain arched buttresses which rest against a wall, in order to consolidate it; and that there can be no doubt of this, I will believe always in the judgment of the architects.

Do you think that the fishes which erect their fortresses by spiral lines, or in the form of a snail-shell, that this is done by them without a reason? No, it is not for beauty only, there is abundant other reason. You should understand, that there are many kinds of fish which have the snout so pointed that they would eat the greater part of the above-named fishes, if their house were built in a straight line; but when they are assailed by their enemies at the gate, in retiring within, they retire by a winding course, and following the track of the spiral line; and by such means their enemies are not able to do them harm. Which being considered, it is not for beauty only, that these things are so done, but for strength. Who will be the man so ungrateful who will not adore the Sovereign Architect, in contemplating the above-named things.

Walking thus over the rocks, I saw marvels which gave me occasion to cry after the example of the Prophet: "Not unto us, O Lord, not unto us, but unto Thy name be glory and honour;" and began to think in myself, that I could not find anything of better counsel, to make the plan of my fortified town. Then I set myself to observe which of all the fishes would be found the most industrious in architecture, in order to take some counsel from his industry.

Now, at that time, a citizen of Rochelle, named l'Hermite, had made me a present of two very large shells, that is to say, of the shell of a purple-murex, and the other of a conch, which were brought from Guinea, and were both made in the manner of a snail-shell, and with spiral lines: but that of the conch was stronger and larger than the other. At the same time, considering the proposition which I have above held, namely, that God has

bestowed more industry upon the weak things than upon the strong, I stayed to contemplate more closely the shell of the purple-murex than that of the conch, because I assured myself that God had given to it something more, to make compensation for its weakness. And so, having dwelt long upon these thoughts, I took heed that in the shell of the murex there were a number of projections tolerably large, by which the said shell was surrounded. I assured myself then, that not without cause, had the said horns been formed, and that they were so many bulwarks and defences for the fortress and refuge of the said purple-murex. Seeing which, I could find nothing better for the building of my fortified town, than to take example from the fortress of the said purple-murex, and took straightway a compass, rule, and other tools necessary for the making of my picture. In the first place, I made the figure of a great square, around which I made the plan of a great number of houses, to which I put the windows, doors, shops, all looking towards the external part of the plan and the streets of the town; and near one of the angles of the said open square, I marked the plan of the house or dwelling of the principal governor of the said town, in order that none might enter into the said square without the permission of the governor; and surrounding the said square, I made the plan of certain advanced or ground galleries, to hold the artillery under cover, and made the plan in such wise that the walls before the gallery will serve for defence and battery, containing many portholes along their whole circuit, which are all directed towards the centre of the said square; in order that if the enemies should enter by a mine into the said square, there would be means ready in a moment

to exterminate them. Which being done, I commenced a turn of street from the outlet of the said portal, enveloping the plan of the houses which I had marked on the place of the said square, intending to build my town in the form of a spiral line, and following the form and industry of the purple-murex; but when I had a little thought of my affair, I perceived that the business of cannon is to play in straight lines, and that if my town were built entirely in accordance with a spiral line, the cannon could not play down the streets; for which reason I resolved then to be guided by the industry of the murex, only in as far as it might serve me; and I began to mark the plan of the first street, near to the square, outside its circumference, in a square form; and this done, I marked the dwellings on the outside of the said street, all having their aspects, entrances, and exits, towards the centre of the said square; and thus there appeared a street having four faces in the first row, which is about the middle, and winding like the shell of the murex, and this always by straight lines.

I began afresh to mark a street outside the first, also surrounding it; and after these two streets were drawn, with the necessary houses round them, I began to follow the same circuit for the drawing of the third street; but, because the square and the two streets about the same had greatly lengthened the circuit, I found it good to give eight faces to the third street; and this for many reasons.

When the third street was drawn thus, with the necessary houses round it, I found my invention very good and useful, and came again to mark and draw another street like to the third, that is to say, with eight faces, and always enveloping the last; this done, I found that

the said town was sufficiently spacious, and came to mark the houses round the said street, joining the walls of the said town, which walls I proceeded to represent joined with the houses of the street adjacent to them. Then, having thus made my plan, it seemed to me that my town put to shame all others; because all the walls of other towns are useless in a time of peace, and those which I make will serve at all seasons, for habitation to the same people who will be in exercise of many trades, while they act as a garrison to the said town.

Item.—Having made my picture, I found that the walls of all houses would serve also as horns; and from whatever side the cannon might be brought against the said town, it would come always under a length of wall. Now, in the town there will be only one street, and one entrance, which will lead spirally winding, and that by straight lines, from angle to angle, into the square, which is in the centre of the town; and in each corner and angle of the faces of the said streets, there will be a double and vaulted gate, and above each of these a high battery or platform, in such wise, that from the two angles of each face one may at all times fire from end to end out of cover, by means of the said vaulted gates, and this without the possibility of harm done to the cannonaders.

Having thus made my picture, and being well assured that my invention was good, I said in my mind, I may now boast, that if the king would build a fortified town in some part of his kingdom, I would give him a picture, plan, and model of a town the most impregnable that exists in our day among men; that is to say, in as far as concerns the art of geometry and architecture

—the places being excepted which God has fortified by nature.

And in the first place, if a town be built according to the model and picture which I have made, it will be impregnable:

By multitude of people,
By multitude of cannon-balls,
By fire,
By mine,
By scaling-ladders,
By famine,
By treason,
By sapping.

Interpretation of some Articles.

Some will find strange the article of treason, but it is so, that if ten or twelve parts of the town, and even the governor of the same, had plotted together with the enemies to surrender the town, it is not in their power to surrender it, provided that there is one small part of the town which will resist; because the order of the buildings will be so well concatenated, that it would be necessary to have the consent of all the inhabitants to treason, before it could be surrendered, and the general conspiracy could never be made without the prince being made cognisant thereof.

Item.—People will be amazed at my saying that it is impregnable by famine: I say this, because it can be garrisoned by very few people; I say, very few, for if very few people should be provided with biscuit for certain years, there are no cannonaders so fierce, no engineers so subtle, that they would not be obliged to raise the

siege from before such a town, though to their own confusion.

Item.—People will be astonished at my saying that it would be impregnable by sap, but I say more, that if the enemies should have sapped and carried away the foundations of the whole circuit of the town, and if they had thrown them into the abysses of the sea, yet so it is that by such means the inhabitants would have no occasion to be confounded, because walls will still surround them as before. And if it happened that the enemy were still more obstinate, and dashed about the circuit of the walls as many cannon-balls as there could fall drops of water in a rain of fifteen days, and by such means they had reduced the whole circuit of the walls to little bits like chips, that is to say, laid the walls low into fallow, yet for all that the town would not at all be lost, nor the inhabitants injured in their persons.

And what is more, if the enemies had been still more determined, and had broken a way quite through the middle of the said town, and that they could pass and repass through the said town to the number of forty abreast, drawing with them all kinds of engines and artillery, yet so it is that they would not yet have gained that town; which thing, I know, will be thought very strange.

I say also, that if the enemies should find means, by a subtle mine, to rise up in any place which may be in the midst of the town, and they shall be entered into the said town in such great number of men and artillery, that all the said place might be full of well-armed men, so it is that by such means they will have gained nothing except the shortening of their days.

And if it should happen that the enemies had made such

an effort, that by their multitude they had made mountains, which were so high that the enemies might have looked down to the very pavement of the streets adjacent to the walls, to throw balls and all kind of engines and strange fires, by such means the inhabitants would suffer no damage, except it were fear, and the poisoning of their air by foul matters, which might be thrown into the street adjacent to the walls, but not into the others.

Item.—The arrangement of the town would be made with such subtlety and invention, that even children above six years old could aid in defending it on the day of assault, and that, too, without displacing any one of them from his own home and dwelling, and without exposing their persons to any danger.

I know well that some would laugh at this; nevertheless, I am assured of all that is above said, and am ready to expose my life, if I cannot make the truth apparent by a model, in which will be demonstrated the appliances and secrets of the said fortress in such manner, that by the said model every one will know the truth, precisely as if the town were built.

Question.—You make here rather a rash promise, to say that by picture and plan you can make it easily understood, that what you have said about the fortified town contains truth. Why is it, then, that you have not put into this book the picture and plan of the said town; for by that, one would have been able to judge whether your statement contains truth?

Answer.—You have very ill remembered what I said; for I did not tell you that by the plan and picture one might judge the whole, but with the plan and picture, I added, that it was requisite to make a model; at the same time,

that there is no reason why it should be made at my expense. I have told you fairly that the thing would merit recompense; wherefore, it is a just thing that the labour on the said model should be paid for at the cost of those who wish to have it? Now, if you know any one who wishes to have a model of my invention, you may refer him to me, as I hope you will. And in this place, I will pray the Lord God to hold you in his keeping.

HOW TO GROW RICH IN FARMING.

To have more ready comprehension of the present discourse, we will conduct it in the form of dialogue, in which we will introduce two persons; the one will inquire, the other will reply as follows:

SINCE we are upon the subject of honest delights and pleasures, I may assure you that for many days I have begun to busy myself on one side and the other, in search of a hilly place, proper and convenient, to build a garden for my retirement, and the refreshment of my mind in a time of dissensions, plagues, epidemics, and other tribulations, with which we are in this day greatly troubled.

Question.—I cannot clearly understand your design, because you say that you seek a hilly place to make a delectable garden. It is an opinion contrary to that of all the ancients and moderns; for I know that people commonly seek level places for the forming of gardens; also, I know well that some having banks and mounds

in their gardens, have put themselves to great expense to level them: "Which being considered, I pray you to tell me the cause which has moved you to seek a hilly place for the erection of your garden.

Answer.—Some days after that the disturbances and civil wars had been appeased, and that it had pleased God to send us His peace, I was one day walking through the meadows of this town of Xaintes, near to the river Charente, and while I was contemplating the horrible dangers from which God had preserved me in the past time of tumults and horrible troubles, I heard the voice of certain virgins, who were seated under certain groves, and sang the Hundred and Fourth Psalm. And, because their voice was soft, and exceedingly harmonious, that caused me to forget my first thoughts; and having stopped to listen to the said Psalm, I passed through the pleasure of the voices, and entered into contemplation of the sense of the said Psalm; and having noted the points thereof, I was quite confused with admiration of the wisdom of the royal prophet, saying to myself: "O divine and admirable bounty of God! I would that we all held the works of Thy hands in such reverence as the prophet teaches us in this Psalm." And then I thought that I would figure in some large picture the beautiful landscapes which the prophet describes in the above-named Psalm: but soon after my courage was altered, seeing that pictures are of short duration; and I thought to find a place convenient for building a garden, according to the design, ornament, and excellent beauty, or part thereof, which the prophet has described in his Psalm; and having already figured in my mind the said garden, I found that I could, accordant with the same plan, build near the same garden a palace or

amphitheatre of refuge, which might be a holy delectation, and an honourable occupation for the mind and body.

Question.—I find you very far removed from all common opinion in two respects: the first is, because you say that it is requisite to find a hilly place to build a delectable garden; and the other, because you say that you would also build an amphitheatre of refuge for the exiled Christians, which I cannot take in good part. Consider that we have peace, also that we hope that shortly there will be liberty of preaching through all France, and not only in France, but also through all the world; for it is so written in St. Matthew, chapter xxiv., there where the Lord God says, that the Gospel of the kingdom shall be preached in all the world, for a witness unto all nations. That is what causes me to say, and to assure you, that there is no longer need to seek out cities of refuge for the Christians.

Answer.—You have very ill considered the sayings of the New Testament; for it is written, that the children and elect of God shall be persecuted to the end, and hunted and mocked, banished, and exiled. And as for the saying which you have adduced, written in St. Matthew, true it is that it is written that the Gospel of the kingdom shall be preached in all the world; but it does not say that it shall be received of all; but says, indeed, that it shall be a witness unto all, that is to say, to justify those who believe, and to condemn justly the unfaithful. In consequence of which, it is to be concluded, that the perverse and iniquitous, simoniacs, the avaricious, and all kinds of wicked people, will at all times be ready to persecute those who, by straight roads, would follow the statutes and ordinances of our Lord.

Question.—As for the first point, I grant it to you; but when you say that a hilly place is required for the erection of a garden, I cannot agree with you.

Answer.—I know that all folly, sanctioned by custom, is accepted for a law and a virtue; but I do not stop at this point, and by no means desire to be an imitator of my predecessors, except in as far as they have done well according to the ordinances of God. I see so much error and ignorance in all the arts, that it seems to me as if all order were for the greater part perverted, and that each labours on the soil without any philosophy, and all jog always at the accustomed trot, following the footsteps of their predecessors, without considering the nature or the prime causes of agriculture.

Question.—You astonish me now more than ever with your propositions. One would suppose, to hear you speak, that some philosophy is needed by the labourers—a thing which I find strange.

Answer.—I tell you, that there is no art in the world, in which a greater philosophy is required than agriculture; and tell you, that when agriculture is conducted without philosophy, it is the same thing as a daily violation of the earth, and of the things which she produces; and I wonder that the earth, and the natures generated in the same, do not cry vengeance against certain murderers, ignorant and ungrateful, who daily do nothing but spoil and waste the trees and plants without any consideration. I dare well affirm, too, that if the earth were cultivated as it ought to be, one day would produce the fruit which two give, in the way that it is now cultivated daily. Do you not remember to have read a story, that there was a certain agricultural person, who was so very good a philosopher, and so subtly ingenious,

that by his labour and industry he contrived that the little ground he owned rendered him more fruit than came of a great quantity of that belonging to his neighbours; whence followed a great envy; for his neighbours, seeing such things, were troubled at his well-being, and accused him that he was a sorcerer, and that by his sorcery he caused his land to bear more fruit than that of his neighbours. Which seeing, the judges of the city called him before them, to make him declare what was the reason why his lands bore so great abundance of fruits; which seeing, the good man took his children and his servants, his cart and team, and with this, many instruments of agriculture, which he went to exhibit before the judges, pleading before them that the sorcery he used upon his lands, was the toil of his own hands, and the hands of his children and servants, and the different tools he had invented; for which the good man was praised greatly, and went back to his labour; and by such means the envy of his neighbours was made amply known.*

Question.—I pray you, tell me wherein it is necessary that the labourers have some philosophy; for I know that many will jest at such an opinion: take heed that ye be not seduced by vain philosophies.

Answer.—You deceive yourself in alleging this passage of St. Paul in this place, inasmuch as it makes nothing against me; for when St. Paul says, "Take heed that

* A story that has been told often, out of Pliny's Natural History, book xvii. The farmer, who is its hero, was C. Furius Ctesinus, a freedman. This was the speech with which he introduced before the judges his household and his tools, in answer to the charge against him:—"Veneficia mea, Quirites, hæc sunt, nec possum vobis ostendere, aut in forum adducere lucubrationes meas, vigiliasque et sudores." True Roman eloquence.

ye be not seduced by philosophy," he adds "vain;" but that of which I speak is not vain but it is approved good by St. Paul himself: but you should understand, that when St. Paul writes that one must take heed against vain philosophy, he speaks to those, who through human philosophy desired to understand God. Wherefore I conclude that to make nothing against my opinion. How do you think that a labourer should know the seasons of labouring, planting, or sowing, without philosophy? I would venture to tell you, that one might labour on the soil in such a season, that one would cause to it more harm than good. *Item,* how will a labourer know the difference of soils without philosophy? Some are suitable for wheat, others for rye, others for peas, and others for beans. The beans grown in one field are fit to cook, and quite close to it there will be another field, in which the beans that will be there produced will not be fit to cook at all; and it is the same with all kinds of pulse. Also, there are waters in which the pulse cannot be cooked, and there are other waters in which the pulse will be cooked fitly. In short, it is impossible to be able to recite to you how much natural philosophy is requisite to farmers; and it is not without cause that I have put these propositions first; for the ignorant acts that I see daily committed in the art of agriculture, have caused me often to torment myself in my spirit, and to be wrathful in my solitary thoughts; because I see that every one tries to aggrandise himself, and seeks means to suck the substance of the earth, without bestowing labour for the purpose; and meanwhile, men leave the poor untaught folk to the cultivation of the soil: whence it follows that the soil, and that which it produces, are often adulterated, and great

violence is done to the bovine animals which God has created for man's relief.

Question.—I pray you to show me some fault committed in agriculture, in order to make me believe what you say.

Answer.—When you walk through the villages, consider a little the muck-heaps of the labourers, and you will see that they put them outside their stables, now on a high place, now on a low place, without any consideration, but if the heap be piled up, it suffices them; and then take notice in a time of rain, and you will see that the waters which fall on the said muck-heaps, carry away a black tint in passing through the said heaps; and finding the base, slope, or inclination of the place on which the heaps are put, the waters which pass through the said heaps will carry away the said tint, which is the chief part and whole sum of the substance of the muck-heap, for which reason the muck-heap so washed can serve only for a parade; but being carried to the fields, it there yields not any profit. Do you not see, then, a manifest ignorance, which is greatly to be regretted?

Question.—I believe nothing of that, if you do not give me other reason.

Answer.—You should understand, in the first place, the cause for which men carry the muck-heap to the field; and having understood the cause, you will believe easily what I have told you. You must needs confess to me, that when you bring the muck-heap to the field, it is to restore to it a part of that which has been taken from it; for it is so, that in sowing wheat, men hope that one grain will yield many; now, that it cannot do without taking some substance from the soil, and if the

field has been sown many years, its substance has been removed in straw and grain. For which reason it is necessary to bring back the muck-heaps, filths, and impurities, and even the excrements and ordures as well of men as of beasts, if it were possible, in order to restore to the place the same substance which had been taken from it; and that is why I say that muck-heaps ought not to be left at the mercy of the rains, because the rains in passing through the said heaps, carry away the salt, which is the main substance and virtue of the muck-heap.

Question.—Now you have given me a proposition which makes me muse more than all the rest, and I know that many will laugh at you, because you say that there is salt in muck-heaps; I pray you, give me some evident reason to make me believe that.

Answer.—Just before, you thought it strange when I told you that some philosophy was requisite for labourers, and now you ask me for a reason which depends very much upon my first proposition. I will tell it you, but I pray you to hold it in such esteem as of itself it merits; in attending to this, you will understand several things of which you have hitherto been ignorant. Note, then, that there is no produce of the soil, whether good or bad, that does not contain in itself some kind of salt; and when the straw, the hay, and other herbs, are putrefied, the waters which pass through them carry away the salt which was in the said straws and other herbs, or hay; and just as you see that a salt haddock, which may have been long in soak, would at last lose all its salsitive substance, and at length have no taste at all, in like manner you must believe that the muck-heaps lose their salt when they are washed by the rains.

And forasmuch as you might allege against me, saying that the muck-heap remains a muck-heap, and that being carried to the soil, it might still be of much service, I will give you an example to the contrary. Do you not know well, that those who extract the essences from herbs and spicery, extract the substance of the cinnamon without any destruction to its form? At any rate, you will find, that in the liquor which they will have drawn out of the cinnamon, they will have removed from the said cinnamon its flavour, its smell, and the entire properties of the same; this, notwithstanding the cinnamon will remain in its form, and will have the appearance of cinnamon as before; but if you eat some of it, you will find in it neither smell, nor taste, nor properties. That is an example which should suffice to make you believe what is above.

Question.—If you had preached to me for a space of a hundred years, so it is that you could not make me believe that there is salt in muck-heaps, nor in all kinds of plants, as you wish to make me believe.

Answer.—I will give you, now, some arguments which will make you believe that which you deny, or else it must be that you have the head of an ass upon your shoulders. In the first place, you must confess to me that glass-wort is a herb which grows commonly in the soil of the marshes of Narbonne and Xaintonge. Now, the said herb, being burnt, reduces itself to a stone of salt, which salt the apothecaries and alchemical philosophers call *sal alkali:* in short, it is a salt proceeded from the herb.

Item.—Fern also is a herb, and, being burnt, reduces itself to a stone of salt; witness the glass-workers, who make use of the said salt to make their glasses, with other things

which we will mention when occasion shall present itself in treating of stones.* *Item*, consider a little the cane from which sugar is made: it is a jointed herb, and hollow like a stem of rye, made in the fashion of a reed; this notwithstanding, from the same herb sugar is drawn, which is no other thing than a salt. True it is, that all the salts have not one savour, and one appearance, and one action; at the same time that does not hinder them from being salts; and I venture to tell you afresh, and to maintain daringly, that there is no plant, nor kind of herb upon the earth, which has not in itself some species of salt; and tell you further, that there is no tree, of whatever kind it may be, which does not accordingly contain some of it, some more, some less. And what is more, I venture to say, that if there were in fruits no salt, they would have no savour, property, or odour, nor could we hinder them from putrefying; and that you may not say I am speaking without reason, I instance to you the principal fruit in use amongst us, namely, the fruit of the vine. It is a certain thing, that the lees of wine having been burnt, they reduce themselves into salt, which we call salt of tartar: now, this salt is greatly mordicative and corrosive: when it is put in a damp place, it reduces itself into oil of tartar, and many heal ulcers with the said oil, because it is corrosive. The salt of the herb glass-wort, when it is kept in a damp place, is as oleaginous as that of tartar. Those are reasons which ought to make you believe that there is salt in trees and plants.

Were any one to ask me how many kinds of salt there are, I would reply, that there are as many kinds as there

* The treatise on stones occurs in Palissy's last work, not published until seventeen years after that which includes the present essay.

are diversities of savour. It is, then, to be concluded that the salt of pepper and of grains-of-paradise is more corrosive than that of cinnamon; and the more strong and powerful are wines, the more they abound in salt, which causes the strength and virtue of the said wine.

To show this to be so, contemplate a little the wines of Montpellier: they have an admirable power and strength, such that the husks of their grapes burn, and calcine plates of brass, and reduce them into verdigris; and if any one ventures to say that this is not done by the virtue of the salt that is in the said husks, my statement is easily to be verified, because it is a certain thing, that if one puts common salt or salt-of-tartar in a brass pan, it will become green in less than four-and-twenty hours, provided that the salt be dissolved; and that it does by reason of its tartness. There you have an argument which should suffice to you for the whole; however, to enable you better to understand these things, I will now teach you to extract salt from kinds of trees, herbs, and plants; and so, will make you understand it presently, without putting your own hand to the work. You will readily confess to me, that all ashes are useful in the washing-tub; also you will confess to me, that the same ashes can be of use once only in the said wash. If you confess so much, it is enough; for by that you ought to understand, that the salt which was in the ashes has become dissolved and mingled with the lye, and that has caused the removal of the dirt and ordure from the linen: whence it follows, that the lye is tinctured and oily with the said salt, which is dissolved throughout it; and the lye, having come to its perfection, has removed all the salt which was in the said ashes;

whence it comes, that the ashes remain altered and useless, and the lyë, which removed the salt of the said ashes, has always some property of cleansing. If you will not believe these reasons, take a cauldron of lye, and let it boil till all its moisture is evaporated, and then you will find the salt at the bottom of the cauldron.

If the above-said arguments are not sufficient, take notice of the smoke of wood; for it is so that the smokes of all kinds of wood make the eyes smart and injure the sight, and this because of certain salsitude which it draws from the wood, when the other humours are exhaled by the vehemence of the fire, which chases the hurtful and humid matters: and that this is so, you will recognise when you cause water to boil in some cauldron; because the smoke from the said water will do no harm whatever to the sight, though you present your eyes over the said smoke. And to prove to you, better still, that there is salt in wood and plants, consider the bark with which the tanners curry their hides. If it is dried and pulverised, it hardens and preserves from putrefaction the skins of oxen and other beasts. Do you think that oak-bark would have virtue to hinder the putrefaction of the said skins, if there were not any salt in the said barks? No, in truth; and if it were so that the bark had this property, it could be used many times; but after it has been used once, the moisture of the skin has caused attraction, and has dissolved the salt which was in the bark, and has taken it and drawn it to itself, to strengthen and harden itself; and so the said bark can no more be used for anything, except to put upon the fire, after it has been used once only.

Another example. I remember to have seen certain stones which were made of burnt straw, which could not be

unless the said stones contain in themselves a great quantity of salt. *Item*, the fire once took a barn full of hay; the fire was so great that the said hay was finally reduced to stone, in the way that I have told you occurs with glass-wort and fern; but, because in the said hay there is less salt than in glass-wort and tartar, the said stones of hay and straw* are not subject to dissolution, therefore endure the injury of time as a piece of iron dross might do. I know, also, that many glass-workers, among those who make the glass for window-panes, use the ash of beech-wood in place of glass-wort; which is as much as to say, that the ash of the said beech is no other thing than salt, for otherwise it could not be of use in this affair.

If I would put into writing all the examples that I could find, there would be need to take up a great deal of time; but in conclusion, I say to you as above, that there are an infinite number of kinds of salt, that is to say, as many different kinds as there are different savours. Copperas and vitriol are only salts, borax is only a salt, and nitre a salt. I tell you, that if there were not salt in all things, they could not sustain themselves, so they would quickly be putrefied and annihilated.

Salt renders firm, and keeps from putrefaction, fat and

* The editors of the works of Palissy, in 1777, frequently append notes of correction to his writings, which, now and then, correct right into wrong, and show that, two hundred years after his own time, Palissy still stood by no means in the rear rank of existing knowledge. At this point the incredulous editors find it necessary to suggest, that Palissy cannot mean to say that he has seen stones made wholly out of straw. Rickburners, in recent years, have enabled not a few collectors to possess stones left after the burning of a hay or corn stack, similar to those which Palissy detected. They are pure flint. Microscopes have revealed to us minute crystals of flint dispersed throughout the substance of grasses and some other plants, as well as animals. These help to cause the great strength of a wheat-stem, and remain, of course, after the burning of a rick.

other flesh; witness the Egyptians, who made great pyramids to keep the bodies of their deceased kings; and to hinder the putrefaction of the said bodies, they powdered them with nitre,—which is a salt, as I have said,—with certain spices, containing in themselves a great quantity of salt; and by such means their bodies were conserved without putrefaction; even to this day, one finds such bodies still in the said pyramids, which have been so well conserved, that the flesh of the said deceased is used in our day as a medicine, which they call Mummy.

I ask you, have you not seen certain labourers who, when they wish to sow a piece of land two years successively, set fire to the stubble or straw remaining from the grain which has been cut; and in the ashes of the said straw will be found the salt which the straw had extracted out of the earth, which salt, remaining in the field, will aid the land again; and so, the straw being burnt in the field, it will serve as manure would, because it will restore the same substance which it had extracted out of the earth. It is time that I made end to this discourse; for, if you will not believe the above-mentioned reasons, it would be great folly to give you other examples; however, because our discourse has been from the first to show you that the rains carry away the salt of the muck-heaps which are left uncovered, I will give you yet farther, to conclude my discourse, one example, which will suffice to you for all. Take notice, at seed-time, and you will see that the labourers will bring their muck-heaps to the fields some time before they sow the land; they will put the said manure in little heaps or piles about the field, and

some time afterwards, they will come to spread it over the whole field; but on the spot where the said pile of manure shall have been resting for some time, they will leave none of the said manure, so they will throw it this way and that; but in the place where the said manure has rested some time, you will observe, that after the corn which has been sown shall have become high, it will be in that place thicker, taller, greener, and more flourishing than in the other parts.

Thence you may know easily, that it is not the muck-heap which has caused that, for the labourer threw it on other parts; but it is that, when the said manure was on the field in little piles, the rains which occurred passed through the said piles of manure into the ground, and in passing, have dissolved and carried with them certain portions of the salt which was in the said manure; just as you see the waters which pass through earths containing saltpetre, carry with them the saltpetre, and after that the waters have passed through the said earths, the said earths can no longer be used to make saltpetre, for the waters which have passed, have carried with them all the salt: so it is with ashes used by the saltpetre makers, and so with those used in the wash-tub, and that is why they are of no use afterwards, which is the point that should make you believe what I have said to you from the beginning—that is to say, that the waters which pass through muck-heaps, carry away all the salt, and render the manure useless; which is an ignorance of very great weight. And if it were corrected, one could not calculate how great the profit would be. I would that every one who shall see this secret, would be careful enough to pay it the attention it deserves.

Question.—Tell me, then, how I could keep my manure from spoiling?'

Answer.—If you wish to have the full and complete service of your manure, you must hollow a pit, in some convenient place near to your stables; and this pit having been dug in the shape of a pool, or of a watering pond, it is necessary that you pave with flints, or with stones, or with brick, the said pool or pit; and this having been well plastered with mortar made of lime and sand, you will take your manure to be kept in the said pit, until the time when it will be necessary to take it to the fields. And, in order that the said manure be not spoilt by the rains, nor by the sun, you will make some kind of hut to cover the said manure; and when the seed-time shall arrive, you will carry the said manure into the field, with all its substance, and you will find that the pavement of the pit or receptacle will have preserved all the liquid part of the manure; which otherwise would have been lost, and the earth would have absorbed part of the substance of the said manure. And you ought here to note, that if at the bottom of the pit, or receptacle of the said manure, there be found any clear matter, which shall have descended from the muck-heap, and that the said matter cannot be removed in panniers, it is necessary that you should take vessels which will hold water, as if you were to carry vintage, and then you will carry the said clear matter, let it be urine of beasts, or what you please; I assure you that it is the best of the manure, because containing the most salt; and if you thus will render back to the earth the same thing which had been taken from it by the growth of seeds, the seeds which you put into the ground afterwards, will

take up again the same thing that you will have carried thither.

You see, then, how it is necessary that every one should take pains to learn his art, and why it is requisite that the labourers have some philosophy: or otherwise they only bring the earth to an abortion, and commit murder upon trees. The wrongs which they do daily to the trees, constrain me to speak here of them with warmth.

Question.—You make it appear here as if trees were men, and seem to take great pity upon them: you say that the labourers murder them: that is a proposition which gives me occasion to laugh.

Answer.—That is the disposition of the silly, and of enemies to science; however, I know well what I say, for in passing by the copses I have contemplated many times the way in which the woods are cut, and have seen that woodcutters in these parts, when cutting their underwood, would leave the stock or trunk which remained in the ground all hacked, broken, and bruised, not caring for the trunk, provided that they had the wood which is produced from the said trunk, although they hoped that every five years the trunks would produce as much again. I wonder that the wood does not cry out under so villanous a murder.

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Will you hear a good example? There were two labourers who had rented a new piece of land; and for its enclosure they had made a ditch by equal portion, and upon the border of the said ditch they had planted thorns, on the same day, one and the other; some time after that the thorns were large, and good to make fagots for warming their hearths, they agreed together that it was time to clip their palisade or hedge, in order

that the thorns should produce again a multitude of twigs and branches; that settled and agreed, on the appointed day, one of them took a certain volant tool, which resembles a billhook, but which is hafted to the end of a stick, and so he who had this tool, cut his thorns from a good distance with heavy blows, fearing to prick himself, and, in cutting them, made many breakages among the stems and roots of the said thorns; but his companion, more wise than he, showed that he had some philosophy in his mind, for he took a saw, and—having gloves upon his hand—he sawed all the branches of his thorns with the said saw, in such manner that there was no fracture made; but many laughed at him, though, at the last, the laugh proved to be against them: for the part of the hedge which had been sawn so wisely, was found to reproduce its branches in two years, stouter and larger than those of his companion in five years: that is a testimony which should give you occasion to premeditate, and philosophize upon things before you set about them. It is not, then, without cause, that I told you how much philosophy was needed in the art of agriculture.

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EXPERIENCE OF NATURE.

Question.—Do you think that I believe what you now say, of there being salt in the earth, and even in all kinds?

Answer.—Truly, you have a poor judgment: I have proved to you before, that in all kinds of trees, herbs, and plants, there was salt; and now you are ignorant of its existence in all earths. And whence think you that the trees, herbs, and plants, take their salt, if they do not draw it from the earth? You would find it very strange if I were to tell you that there is salt also in all kinds of stones; but I tell you, further, that there is some in all kinds of metals.

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Item.—The trees which are planted in the valleys cannot bear so great an abundance of fruits as those of the mountains or high grounds; and the reason is, because the trees of the valleys are too damp, on account of the abundance of humour, which causes them to employ their time and strength in producing a great quantity of wood and branches, and they seek the sun and be-

come taller and straighter than those which are on the high lands: also, the said trees of the valleys, in like case, have not so great a quantity of oil in their wood as those of the high lands and mountains. Thus you see, also, why they do not burn so well as those of the high places; and the said trees are not of as long duration. And if you will not believe that there is a salt in fruits, contemplate a little some cherry-tree, apple or plum tree: if you note a year when it has scarcely any fruit, and the season is dry, you will find that fruit to be of an excellent savour; and if there comes a very moist year, and if the said tree have a great quantity of fruit, you will find that the said fruit will be insipid, and of bad savour, and of little worth. And that will happen for two reasons: the first is, because the trunk and branches of the said tree have not enough salt to distribute it abundantly to so large a quantity of fruit; the other, because the year has been rainy, and the rains have carried away part of the salt of the said fruit, as would be the case with a salt fish which might be hung to a branch of the said tree.

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The moisture of the air and rains dissolving the salt which is in a stone, the salt, being thus dissolved and reduced into water, leaves its other parts to which it had been joined, and thence it comes that the said stone returns into the state of earth, and being reduced into earth, it is never idle; for if no grain be given to it, it will labour to produce thorns, thistles, or other kinds of herbs, trees, or plants; or even, when the season shall be suitable, it will return once more into the form of stone.

In order to understand these things well, when you pass near walls which have been crumbled by the ravage of

time, taste upon your tongue some of the dust which falls from the said stones, and you will find that it will contain salt; and certain rocks that have been exposed to the air, though they remain still on their natural spot, are subject to the ravage of time. And you ought to note here, that walls and rocks which are cut into by the ravage of time, are much more so towards the quarter of the south and west than of the north, which is an attestation of my statement, namely, that the moisture causes the salt to dissolve, which was the cause of the tenacity, form, and steadfastness of the stone; and you may even see that common salt being in houses, dissolves of itself in time of rains, which are excited by the said winds of the west and south.

Question.—The opinion which you have now expressed to me is the most lying that I ever heard;* for you say that the stone which has been made but a little while, is liable to dissolve because of the ravage of time: and I know that from the beginning God made heaven and earth, he made also all the stones, and thereafter there have none been made. And even the psalm on which you desire to build your garden, testifies that all things have been made from the commencement of the creation of the world.

* The same seems to have been the decision of the Faculty of Theology at Paris. Sixty-one years after their first publication, the opinions concerning stones maintained by Palissy (in this place and in the three or four next pages) were propounded in a public disputation, by Dr. Etienne de Clave, Jean Bitaud, of Xaintes, and Antoine de Villon, otherwise "the Philosophic Soldier." The Faculty of Theology of Paris (in August, 1624) protested against their doctrine, as unscriptural; the treatises were destroyed, and the authors banished from Paris, with a sentence—fitted to the notion of their moral leprosy—by which they were forbidden to dwell in towns, or enter public places of resort. Palissy published his opinions at a time when bigotry was not *less* stern—nine years before the Massacre of St. Bartholomew.

Answer.—I never saw a man who had a brain so tough as yours. I know well that it is written in the Book of Genesis, that God created all things in six days, and that he rested on the seventh; but for all that, God did not create these things to leave them idle, therefore each performs its duty according to the commandment it received from God. The stars and planets are not idle; the sea wanders from one place to another, and labours to bring forth profitable things; the earth likewise is never idle; that which decays naturally in her she renews, she forms over again—if not in one shape, she will reproduce it in another. And that is why you have to take manure-heaps to the earth, in order that the earth may receive again the substance which she gave.

Now, you must here note, that just as the exterior of the earth labours to beget something, so the internal part and matrix of the earth labours at production: in some places it begets very useful coal; in other places it conceives and engenders iron, silver, lead, tin, gold, marble, jasper, and all kinds of minerals, and kinds of argillaceous earth; and, in many places, it engenders and produces bitumen, which is a kind of oleaginous gum, burning like resin; and it often happens, that within the matrix of the earth fire will kindle itself by some compression; and when the fire finds some mine of bitumen, or of sulphur, or of coal, the said fire nourishes and supports itself thus under the ground; and it often happens that, after a long space of time, some mountains will become valleys, by an earthquake or great vehemence which the said fire will engender; or, perhaps that the stones, metals, and other minerals which sustained the mass of the mountain, will burn, and consuming in them-

selves by fire, the said mountain may incline and sink little by little: also, other mountains may manifest and elevate themselves, through the increase of the rocks and minerals which grow within them; or, perhaps it will happen that one district of the land will be engulfed or lowered by earthquake, and then that which shall remain will be found mountainous; and so the earth will always find whereon to labour, as well in its interior parts as on its exterior. And forasmuch as concerns your ridicule when I told you that stones grow in the earth, you have no occasion or reason for laughing at me; but those who laugh will declare themselves ignorant before the learned; for it is certain, that if, since the creation of the world, no stones had grown within the earth, it would be difficult to find at this day a horseload of them in a whole kingdom, except in some mountains and deserts, or other places not inhabited; and I will now give you to understand that it is as I have said. Consider a little, how many million pipes of stone are daily spoiled for making lime.

Item.—Consider a little the roads, you will find that an infinite number of stones are reduced to dust by the carriages and horses which pass daily over the said roads.

Item.—Observe a little the labour of masons, when they shall make some building of dressed stone, and you will see that a very large part of the said stone is spoilt, and reduced to dust or into flour, by the said masons. There is not a man in the world, nor a wit so subtle, that could number the great quantity of stones which are daily dissolved and pulverized by the effect of frosts; not counting an infinite number of other accidents, which daily spoil, consume, and reduce stone to earth.

Wherefore I may assuredly conclude, that if stones had not at all been formed, not grown or augmented, since the first Creation written in the book of Genesis, that it would in our day be difficult to find a single one, except, as I have before said, among high mountains and in places desert and uninhabited; and he would be very lumpish in his wit who could not believe thus, if he has regard to the above-named things.

Question.—Give me, then, some reason which may make me understand how stones grow daily among us, and then I will not teaze you any more.

Answer.—Above all things which made me to believe and understand that the earth would, in the course of nature, produce stones, has been, because I have many times found stones in which, at whatever part one might have broken them, there were to be found shells, which shells were of a stone still harder than the residue; which has been the reason why I have tormented myself, and combated in my mind for the space of many days, to wonder at and contemplate what might be the means and cause of that. And one day, when I was in the Isle of Xaintonge, on the way from Marepnes to Rochelle, I perceived a trench newly dug, from which they had taken more than a hundred cartloads of stones, which, in whatever part or place one might break them, were found full of shells, I say, so close together, that one could not have put the back of a knife between them without touching them; and from that time I began to bow my head, as I went on upon the road, in order to see nothing which might hinder me from imagining what could be the cause of that; and being in this labour of the mind, I thought thereafter a thing, which I believe still, and assure myself that it is true,

that near to the said trench there had formerly been some habitation, and those who at that time dwelt there, after they had eaten the fish which was in the shell, they threw the said shells into that valley, where was the said trench, and by succession of time the said shells had become dissolved in the earth, and also the earth-slough had become purified, and the salts rotted and reduced into fine earth, like argillaceous earth, and thus that the said shells came to dissolve and liquefy, and the substance and property of the salt of the said shells made attraction of the adjacent earth, and reduced it into stone with itself; however, because the said shells retained more salt in themselves than they gave to the earth, they congealed with a congelation much harder than that of the earth; but one and the other reduced themselves to stone, without the loss of their form by the said shells. You have there the cause which, since that time, has made me to imagine and feed my mind upon many secrets of nature, some of which I will point out to you.

Item.—Another time, I walked along the rocks of this town of Xaintes, and in contemplating their natures, I perceived in a rock certain stones, which were made in the fashion of a ram's horn, not so long nor so crooked, but they were commonly arched and about half a foot long. I was the space of some years before I understood what could be the reason why these stones were formed in such a manner; but it happened, one day, that one named Pierre Guoy, citizen and sheriff of this town of Xaintes, found in his farm one of the said stones, which was half open, and had certain dentations which fitted admirably one into the other; and because the said Guoy knew that I was curious in such things,

he made me a present of the said stone, whereat I was greatly rejoiced, and from that time I understood that the said stone had been formerly a shell of a fish, which fish we see no more. And it is necessary to calculate, and believe that this kind of fish has formerly frequented the sea of Xaintonge, for there is found a great number of the said stones; but the kind of fish is lost, because one has fished for it too often, as also the race of salmon has come to be lost, in some countries, from arms of the sea, because people without cessation seek to take it, on account of its goodness.

I was on one occasion at St. Denis d'Olleron, which is at the end of an island of Xaintonge, where I engaged a score of women and children to come and aid me in seeking, on the sea-rocks, certain shells of which I was in need; and having gone upon a rock which was covered daily with the water of the sea, there was shown to me a great number of an armed fish, which was made in the form of a chestnut-husk, flat below, and with a very little hole, by which it attached itself to the rock, and took nourishment by the said hole. Now, the said fish has no form, but is a liquor like the oyster; however, it fills all its shell. Outside and above his shell is all furnished with hairs, hard and prickly, like those of an urchin.

I was much pleased to have found it; and having taken and carried a dozen of them to my house, I was greatly deceived: for when the inside of the shell was removed, the root of the hair, which held against the shell, rotted in a few days, and the said hair fell off; and after the hair had fallen off, the shell remained quite clean, and in the place of the root of each hair, there was a little

boss, which little bosses are arranged in so beautiful an order, that they render the shell pleasant and admirable. Now, some time afterwards, there was an advocate, a famous man and lover of letters and arts, who, in disputing of some art, showed me two shells quite similar in form to the said urchin-shells, but which were quite massive; and the said advocate, named Babaud, maintained that the said stones had been carved by the hand of some workman, and was quite astonished when I maintained against him that the said stones were natural, and found it very strange that I said that I knew well the reason why they had taken a form like that in the earth; for I had already considered that these were some of those urchin-shells, which, by succession of time, had been liquefied, and finally reduced to stone—that is to say, that the salsitude of the said shell had thus congealed, and reduced into stone, the earth which had entered into the said shell. Now, since that time, I have collected many of the said shells, which have been converted into stones.

That is what ought to make you believe that daily the earth produces stones, and that in many places the earth converts itself into stone by the action of a salt, which is the chief cause of the congelation; as you may know that because the shells contain salt, they attract to themselves that which is proper to convert themselves into stone.

Item.—I have found many of the heart-shells which were converted into stone: at the same time, they were massive, as well as joined, as though the fish had been inside. And what will you say of those who have found bones of men enclosed in stones? and others have

found ancient money; is not that attestation that stones augment in the earth?*

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Let us come now to the reason why some stones have so large a number of veins, which are easy of cleavage, and why it is that the veins do not as well descend from on high as run transversely. The reason of that is, because above the mass of stone there is a great thickness of earths: it is most true, that when the stone was made, the water which fell from the rains, passing through the body of the said earth, took with it some kind of salt, and the water having descended to the depth of the spot, where it stopped,—the said water, thus charged with a salt, converted and congealed the earth in which it had stopped into stone; and thus far there was formed a layer or bed of the said stone; and the said stone being hardened, it served, afterwards, as receptacle for the other waters which fell afterwards, and passed through the earths down to the said receptacle; and having again taken some kind of salt in passing through the earths, there was formed another layer or bed, which formed and united itself with the

*Fossil bones of man occur, it is well known, in stones only—as Palissy would say—of modern growth. They have been found in calcareous tufa in Peru, and elsewhere. There is a fossil human skeleton in the British Museum, from Guadeloupe. A tribe of Gallibis, slaughtered by Caribs about 150 years ago, were buried on the shore of that island. The gradual formation of this shore, above the buried bones, into a concretionary limestone, was very rapid, by the percolation of water charged with carbonate of lime, exactly in accordance with the theory of Palissy. Roman coins, embedded in stone, have been taken out of the Thames. In crossing an English river (I remember the fact, and have forgotten the particulars), an army dropped its money-chest into the stream, and, pressed for time, abandoned it. The wood rotted, the iron clasps yielded, in decomposing, one of the glues used by Nature as a stone-maker; and, long afterwards, there was revealed, by accident, a hard rock in that portion of the river-bed, studded throughout with money.

first; and thus, at different times, years, and seasons, many masses of stone have been augmented, and augment daily, in the matrix of the earth.

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Consider a little the manner of making saltpetre. They boil the water which has passed over a saltpetrous earth and over the ashes: is it, therefore, to be said that all the water is converted into saltpetre? No. In the same way, all the water which passes through earths, does not convert itself into stone, but a part: and so there are very few places in the earth which are not provided with stone, of one kind or another, for otherwise it would be difficult to find a single fountain.

Question.—I pray you, quit, for the present, your discourse on stones, and give me a little explanation of these springs, since the subject here presents itself.

Answer.—I have already told you that there are very few earths which are not provided below with stones, or mines of metal or of clay; indeed, very often they are provided with all three kinds: whence it follows, that when the waters of the rains fall from the air upon the earth, they are retained on the said rocks, and the said rocks serve as vessel and receptacle for the said waters: for otherwise, the water would descend into the depths or centre of the earth; but being thus retained upon the rocks, they find sometimes joints and veins in the said rocks, and having found an oozing-place, however trifling, be it crack or cleft, or what it may, the said waters will take their course in the direction of the downward slope, provided they can find the smallest outlet: thence it most frequently happens that out of rocks and hilly places escape many beautiful springs; and the more distant the place from which they come,

proceeding from and passing through good soils, the more will the said waters be wholesome and purified, and of good savour. Also, commonly the waters which proceed from the said rocks, contain more salts, and are better to the palate than the others, because they have always some attraction for the salts which are in the said rocks.*

* * * * * *

Sometimes I used to seek for flints, wherewith to make enamel and artificial stones: now, after having assembled a great number of the said flints, when I would pound them, I found a quantity of them which were hollow within, where there were certain points like those of a diamond, brilliant, transparent, and very beautiful; then I began to cast about, to know what was the reason of that, and not being able to understand by theory, nor yet by natural philosophy, I was taken with a desire to understand by experiment; and having taken a good quantity of saltpetre, I dissolved it in a cauldron with water, which I made to boil; and being

* A note to the Quarto Edition, in 1777, informs us of an application of Palissy's theory to practice, in the year 1705, the details of which are too picturesque to be omitted. Coulange-la-Vineuse, in Burgundy, was a place in which there was much wine, and little water. The domain of the town having come into the possession of an enterprising man, who wished to supply its natural defect, M. Couplet was invited to consider the case in September, 1705, the dry month of an unusually dry year. M. Couplet had studied the theory of springs, which is briefly stated in the above text, and dwelt upon at length by its originator, in a succeeding work. This theory of springs, being perfectly correct, enabled the shrewd student of Palissy to point out to his employer, not only on what spots to dig, but at what depth he would find water. In three months his prophecies having been fulfilled, the water was brought into the town. The joy exceeded that of the most profitable vintage-time; men, women, and children, ran to drink; and the judge of the town, a blind man, travelled out, incredulous, to wave the waters through his hands, as misers finger gold. Somewhere, I think, Palissy has a statue. This, among other pictures, would look well upon its pedestal.

thus boiled and dissolved, I set it to cool; and the water being cold, I perceived that the saltpetre had become congealed at the extremities of the cauldron, and then I poured the water from the said cauldron, and found that the flakes of saltpetre were formed by quadratures and points, very pleasing. Which being thereafter considered in my mind, I saw that the flints, of which I have spoken to you, were congealed: but those which are found massive, it is sign and evident proof that there was enough matter to fill the cavity; and those which were hollow, it is that there was there a superfluity of water, which had dried off while the congelation formed at the extreme parts, and when the humidity of the middle dried away, the matters proper for the flint remained firm and congealed within it, like little diamond points.* I do not say a thing of which I cannot show you evidence, if you will come into my cabinet, for I will show you some of every kind of stone about which I have spoken.

* * * * * *

I will adduce to you another example of the congelation of flints. When I was once at Tours, during the Grands Jours de Paris, which were then at the said Tours, there was there a Grand Vicar of the said Tours,† Abbot of Turpenay, and Master of Requests to the Queen of Navarre—a philosophic man and lover of letters, and of good invention; he showed me, in his

* Under the microscope, common flints appear to have been formed by the deposit of silex in the texture of sponges that lived under an ancient sea. It has been long known that all sponges contain flint, but that all flints are sponges fossilized and loaded with siliceous matter, we have learnt only of late years from Mr. Bowerbank, whose statements on the subject will be found in the *Transactions of the Geological Society*, second series, vol. vi., p. 181, *et seq.*

† Thomas de Gadaigne, of a Florentine family settled in France. He became Cardinal de Farnese, and Archbishop of Tours.

cabinet, many and divers stones; but among all the most wonderful, he showed me a great quantity of white flints, formed in the exact semblance of comfits of different shapes; and the said Abbot made me a present of many, as of a wonderful thing: some days afterwards, he took me to his Abbey of Turpenay; and in passing through a village which is beside the river Loire, he showed me a great cavern, through which one went a good distance under ground, below the rocks; and told me, that in the said cavern there was a rock from which the water fell in small drops, very slowly, and in distilling, it congealed and reduced itself to a mass of white flint; and told me, that they put under the water which distilled, straw, in order that the drops which distilled might congeal upon the said straw, to make comfits of divers fashions; and the said Abbot assured me that the comfit which he had showed me, had been taken from that place, and that it had been made by the abovenamed method: also, several people of the said village attested to me that the thing was so. You may now, therefore, well believe that the water of rains, which pass through earths that are above the rock, brings some kind of salt, which causes the congelation of these stones; which is the proposition which I have constantly maintained to you.

* * * * * *

You would find it very strange, if any one told you that there is wood which converts itself into stone—it would vex you much to believe it; however, I believe that it is so, and know well the reason why that is the case. There is a gentleman near Peyrehouade, which is the residence and town of the Viscount d'Orto, five

leagues distant from Bayonne, which gentleman is Seigneur de la Mothe, and is secretary to the King of Navarre*—a man very curious, and a lover of *vertu:* he was once at the court, in company with the late King of Navarre, at which time, there was brought to the said king a piece of wood which was converted into stone, at which many were astonished; and after that the said prince had received the said stone, he commanded somebody among his servants to lock it up for him among his other treasures: then the Seigneur de la Mothe, secretary abovenamed, prayed the said somebody to give him a little morsel, which he did; and the said La Mothe, passing through this town of Xaintes, made me a present of it, knowing in very good truth that I was curious about such things. That you may find hard to believe, but for my part, I know, in truth, that it is so; and since I have inquired whence it was that the wood converted into stone had been brought. It was told me, that there was a certain forest of Fayan, which was a swampy place; from which I concluded, in my mind, that the wood of Fayan contains in itself more salts than any other kind of wood; wherefore it must be believed, that when the said wood is decayed, and its salt is moistened, it reduces the wood which is already decayed into a kind of muck, or earth, and thereafter the salt which is dissolved in the said wood, hardens the decayed humour of the wood, and converts it into stone; which is the same argument that I told you concerning shells: it is, that to become soft and convert into stone, they lose none of their form: in like way, the wood being reduced to stone, keeps still the form

* La Mothe Fénélon, of whom mention was made in the Biography.

of wood, precisely like the shells. And you see, thus, how Nature no sooner suffers destruction by one principle, than she at once resumes work with another; which is that which I have told you throughout, that the earth and other elements are never idle.

* * * * * *

As for what I have said, that some stones consume through the humidity of the air, I tell you now, not only stones, but also glass, in which there is a great quantity of salt; and to show that it is so, you will find in the temples of Poitou and Brittany an infinite number of glasses, which are bitten on the outside by the injury of time; and the glass-makers say that the moon has done this, but they will pardon me, for it is the humidity of the rains which has caused some part of the salt of the said glass to dissolve. I tell you again, that salts produce marvellous congelations. The alchemists have perceived something of this, for they vex their minds greatly in search of these prepared salts.

I remember having seen a potter who was breaking calcined lead in a handmill; and when dinner-time was announced to him, he sent his servants on before, and took a handful of common salt, and mixed it with the said lead, which was in a liquid clear as water; and, having mixed it, he gave two or three turns to his mill, in order that his servants should not discover the fine secret which had been taught him, of putting salt into his lead to make the colour finer; but on the return from dinner, there was a very fine joke, for he found that the salt, the lead, and the water, had so thoroughly hardened and congealed by the virtue of the salt, that it was no longer possible to turn the millstones; and the upper and the

lower stones were so well fastened together, that it was difficult to separate them. There is a story which it was my design to tell you, for the purpose of better assuring you that salt has power to congeal both stones and metals.

* * * * * *

I wonder very much how people can believe that gold can be of service to restore persons, when it is not dissolved: it is for the same reasons that I have told you, that you cannot find the taste of salt, if it do not, in the first instance, dissolve; and so, also, it is, that one does not find savour in stones which contain salt, wherein the salt is perfectly fixed; how much less will a sick man find taste in gold, if it be not dissolved? Now, so it is, that there is not anything more fixed than gold: you may soak and boil it to your utmost, you will not get it to dissolve. It seems to me, that the nutrition of man is in that his stomach cooks and dissolves the things which it takes by the mouth, and then the substance travels through all parts of the body, and so you have nutrition and restoration; but the stomach of a man, weak and almost dead, how should it be able to dissolve gold, and dismiss it to all parts of the body, seeing that the furnaces, even when forced to a heat more than violent, cannot consume it: the stomach of a man would need to be yet hotter than the furnaces, or I understand nothing in the matter.

True it is, that some philosophers, alchemists, say that they know how to diffuse gold in water by some dissolution: truly, if they can dissolve it, it is potable. Now, let us come to know whether, being potable, it can serve to nutrition. The philosophers say that it is made of sul-

phur and quicksilver; being then dissolved, that will be sulphur and quicksilver, which you will give patients to drink; nothing else can you draw out of it than what has been put in: and at the same time you say, quicksilver is a poison. Will you feed the patient upon poison to restore his health? I cannot understand this matter otherwise; wherefore, I will be silent for the present, and will leave the disputation among those whose opinions are different from mine.

Question.—How can you venture to hold such a discourse against the common opinion of all the doctors? For there has not been one who has not used gold as a restorative.

Answer.—I have not spoken ill to you of the doctors; I should be very sorry to do so, for there are some of them in this town to whom I am greatly attached, and particularly to M. l'Amoureux, who has given me assistance with his worldly goods, and with the labour of his art. At the same time, as if by way of dispute, they should not take it ill of me, if I say what I think about the matter. I know well that many doctors and apothecaries have caused gold to be boiled in the bellies of fat capons, to restore patients, and said that the gold diminished, which they have not succeeded in making me believe. You may boil and fry your utmost, you will not be able to reduce its weight.

If the salt or fat of the pot causes its colour to be found paler on the surface only, that makes nothing against my opinion. If gold could diminish in boiling, the alchemists would have won the prize, and there would not be need of so much labour to dissolve gold; for after they had boiled a great quantity, they could take

the water in which the said gold had been boiled, and having caused the moisture to evaporate, they would find the gold at the bottom of their vessel, of which they could make use according to their purpose.

I ask you, do you know what is the meaning of restorative? does it not mean nutrition, and reparation of nature? Will you think a little upon the effect and nature of things which restore the human body? Consider a little all the things that are good to eat and to refresh, and you will find that as soon as they are upon the tongue, they begin dissolving, for otherwise the tongue could not judge of the flavour of the thing, and the tongue receives no flavour, nor good nor bad taste, from that which is presented to it; you may by that easily judge, that neither can the belly or the stomach receive any savour from that which shall be presented to them.

Consider, also, that there is nothing good for food which in itself is not subject to heat, corrupt, and putrefy: it is a notable argument to sustain my proposition. Now, so it is that gold is liable to no one of these accidents. You may pile as you will dollars together, they will not generate heat, nor putrefy, as things do which are good to eat. What will you say to that? Have you anything that will legitimately contradict my proposition? Perhaps you will say, that we are bound to believe the learned men and ancients who have written these things, a very long while ago: that you must not take heed to my speaking, inasmuch as I am neither Greek nor Latin, and have never even seen the volumes of the doctors. To this I answer, that the ancients were men like the moderns, and that they were quite as liable

to be deceived as we are; and to know that this is so, regard a little the works of Isidore, of the Lapidary,* and of Dioscorides, and many other ancient authors; when they speak of rare stones, they say that some have power against devils, and others against sorcerers, and others serve to make a man agreeable, handsome, and victorious in battle; with more than a thousand other virtues which they attribute to the said stones.

I ask you, is not this a false opinion, and directly opposed to the authorities of Holy Scripture? If so it is that these doctors, ancient and so excellent, have erred in talking about stones, why is it that you would have me to deny their capability of erring when they talk of gold? If you say that perhaps gold, being in the body, has power to attract to itself the evil humours, as the loadstone attracts iron, I ask you then, why is it that you separate it into so many parts? for some eat it in filings, others beaten into leaves, and of a kind extremely slender. Now, if the loadstone were thus pulverised, it would not have that power of attracting iron which it has, being joined into a mass. Wherefore I conclude, that if there be given to me no reason better than those which I have adduced, I must remain unable to believe that gold can restore a sick person, any more than if there were sand in his stomach, and this, inasmuch as it is impossible for any stomach to be able to dissolve it.

* Jean de Mandeville was the author of *Le Lapidaire, contenant la vertu et propriété des Pierres précieuses*, published at Lyons without date.

THE HUGUENOT'S PREFACE.*

TO MONSEIGNEUR
THE MARSHAL DE MONTMORANCY,†

Knight of the Order of the King, Captain of Fifty Lances, Governor of Paris and of the Isle of France.

MONSEIGNEUR,

Though there are some who would at no time hear mention of the Holy Scriptures, yet so it is that I have found nothing better than to pursue the counsel of God, His edicts, statutes, and ordinances; and in regarding what might be His will, I have found that by His last testament he has commanded his heirs that they should eat bread by the labour of their bodies, and that they should multiply the talents which he had committed to them, in accordance with His testament.

* These four letters constitute the prefatory matter to a book by Bernard Palissy, entitled "*A Trustworthy Receipt, by which all the Men of France may learn how to Multiply and Augment their Treasures.*" This book (though without headings or divisions of any kind, even so much as into paragraphs) contains four Treatises: 1, On Agriculture; 2, On Natural History; 3, The Delectable Garden; 4, The Fortified Town. The volume was first published in the year 1563, soon after the liberation of Palissy from a prison, through the friendship, principally, of the Duke de Montmorenci, constable of France.

† Eldest son of the Duke de Montmorenci.

"Which having considered, I have not been willing to hide in the ground those talents which it has pleased Him to allot to me; therefore, to cause them to bring profit and increase, according to his commandment, I have been desirous to produce them before every one, and especially before your lordship, knowing well that by you they would not be despised, though they have, indeed, proceeded out of a poor treasury, being held by a person very abject and of low condition; this notwithstanding, since it has pleased my lord the constable, your father, to do me the honour to employ me in his service, for the building of an admirable rustic grotto of new invention, I have not feared to address to you a portion of the talents which I have received from Him in whom all gifts abound. My lord, the talents which I send you are, in the first place, some good secrets of nature and of agriculture, which I have put into a book, desiring by that means to excite good feeling in all men towards the earth, to make them lovers of virtue and just toil, and especially of the art of agriculture, without which it would be impossible to live. And because I see that the earth is cultivated most frequently by ignorant men, who only cause it to miscarry, I have put several instructions in this book, which are competent to be the means of enabling men to gather more than four million bushels of grain yearly in France, above what is customary, provided that they be content to follow my advice, which I hope that they who are subject to you will do, when they have received the information given in this book.

Item.—Because you are a lord, powerful, magnanimous, and of good judgment, I have thought good to design for you the arrangement of a garden, as beautiful as ever

any was on earth, excepting that of the terrestrial Paradise, which design of a garden I assure myself that you will find to be of good invention.

Item.—In this book is contained the design and arrangement of a fortified town, such that, until now, one has not heard speak of the like. There are in the said book many other fruitful matters, which I will leave to be told to you by those who, in reading, shall remember and make report of them to you. I have not put a picture of the said garden in this book, because there are many who are not worthy to see it, and especially the enemies of virtue and good wit; and also my indigence, and the occupations of my art, have not permitted it. I know that some ignorant men, enemies of virtue, and calumniators, will say that the design of this garden is a dream only, and will, perhaps, compare it to the dream of Polyphile, or will be likely to say that it would cost too much, and that one could not find a place fit for the building of the said garden according to the design. To this I reply, that there will be found more than four thousand noble houses in France, adjacent to which may be found many fit spots for the building of the said garden, according to the tenour of my design. And as for the expense, there are in France many gardens which have cost more than this would cost.

Whenever it may please you to do me the honour to employ me in this affair, I will not fail to provide you quickly with a picture, and even will put the plan into execution, if you should feel inclined to have this done. And forasmuch as concerns the plan and arrangement of the fortified town, I know that some will say that no notice should be paid to my speaking, inasmuch as I have

not been exercised in the military profession, and as it is impossible to understand the making of these things, without having first seen a number of batteries and assaults of towns. To this I reply, that the work which I have begun for my lord the constable gives witness enough of the gift which God has given me, to close their mouths; for if they inquire into it, they will find that such a work has not before been seen.

Item.—Having made more ample inquiry, they will find that no man has taught me to understand the details of the above-named work. If, then, it has pleased God to distribute to me of his gifts as an artist in earth, who will deny that He has also sufficient power to communicate to me a portion of understanding in the military art, which is acquired rather by nature, or natural sense, than by practice? The fortification of a town chiefly consists in tracings and lines, according to geometry; and it is well known that, thanks to God, I am not at all ignorant of those things. I have assumed the boldness to propose to you these arguments, in order to obviate the detraction of some who might persuade you, by saying that the thing is impossible. At any rate, I submit myself to receive shameful death, if I do not make apparent the truth to be as I say, whenever and wherever it may please you to employ me in this business.

If these things are not written with so much dexterity as is due to your greatness, you will be pleased to pardon me; and this it is my hope that you will do, seeing that I am not Greek, nor Hebrew, nor poet, nor rhetorician, but a simple artisan, poorly enough trained in letters: this notwithstanding, for such reasons, the thing in itself has not less value than if it had been

uttered by a man more eloquent. I had rather speak truth in my rustic tongue, than lie in rhetoric. Therefore, my lord, I hope that you will receive this small work with as ready a will as I have a desire that it shall give you pleasure. And, in this place, I will pray the Lord God, monseigneur, to give you, in perfect health, good and long life.

Your very affectionate and very humble servant,

BERNARD PALISSY.

From Xaintes.

TO MY VERY DEAR AND HONOURED LADY, MADAME THE QUEEN-MOTHER.

MADAME,

Some time after that, by your means and favour at the request of my lord the constable, I was delivered from the hands of my cruel enemies, I entered into a debate within my mind upon the fact of the ingratitude of men, knowing well that the cause for which they would have delivered me to death, was no other than because I had sought after their good, even the greatest good that ever could accrue to them. Which being considered, I retired within myself, to search the secrets of my heart, and to enter into my conscience, that I might know whether there was in myself any ingratitude like that of those who had delivered me to the peril of death. It came to me, then, to remember the good which it pleased you to do me, when by your favour you engaged the authority of the king for my deliverance. Which seeing, I found that it would be in me a great ingratitude if I were not regardful of such boon. Nevertheless, my indigence has not permitted

that I should transport myself into your own presence to thank you for such boon, which is the smallest recompense that I could make. And although God has given me several inventions with which I could do you service, nevertheless I have not had means to explain them to you, which has caused me to bring into the light, in recompense of this, several secrets contained in this book, whose tendency is to increase the wealth and virtue of all the inhabitants of the kingdom.

My littleness has not dared to take the liberty of dedicating my work to the king, knowing well that some would say that I had done this for the sake of being recompensed: if it had been so, it would have been no new thing. Madame, there never was a time when good inventions received their reward from kings; nevertheless, I have hope that this work will be more useful to the king than to any other person. At the same time, because of my littleness, I have dedicated it to Monseigneur de Montmorancy, good and faithful servant of the king, which I hope he has found means to make very well understood by his sovereign prince and king. There are things written in this book which will be able to assist much in the building of your garden of Chenonceaux; and if it shall please you to command me to do you service therein, I shall not fail to employ myself about it. And if you should feel inclination to do this, I will do things that no other man has done up to the present day. Which is the place, Madame, where I will pray the Lord God to give you, in perfect health, long and happy life.

Your very humble and very affectionate servant,

BERNARD PALISSY.

TO MONSEIGNEUR THE DUKE DE MONTMORANCY, PEER AND CONSTABLE OF FRANCE.

MONSEIGNEUR;

I think that you may find it ill in me, that I did not thank you at the time when you were pleased to engage the queen-mother to draw me out of the hands of my mortal and capital enemies. You know that the occupation of my time upon your work, together with my indigence, have not permitted it. I doubt whether you would have found it good, if I had quitted your work to bring you large thanks. Jesus Christ has left a counsel to us, written in Saint Matthew, chap. 7, by which he forbids us to scatter pearls before the swine, lest, turning upon us, they rend us. If I had obeyed this counsel, I should not have been in suffering, to pray to you for my deliverance; assuring you, in truth, that those who hate me have had none occasion against me, except in that I have urged upon them, many times, certain passages of Holy Writ, in which it is written, that he is unhappy and accursed, who drinks the milk and wears the wool of the sheep, without providing for it pasture. And by as much as that ought to have incited them to love me, they have therein made for themselves occasion to desire that I should be committed to destruction as a malefactor; and it is a true thing, that if I had depended on the judges of this town, they would have caused me to be put to death, before I should have been able to obtain from you any assistance. And the occasion which moved some judges to be one body, and one soul, and one single will, with the dean and chapter, my prosecutors, was because some of the said judges were companions of the said dean and

chapter, and possess some morsel of benefice, which they fear to lose, because the labourers begin to murmur in paying the tithes to those who receive without deserving them.

I should have taken good heed not to fall into their sanguinary hands, had it not been that I hoped they would have regard for your work, and for their duty to monseigneur the Duke de Montpensier, who gave me a safeguard, forbidding them to take cognisance of, or undertake anything against me, or against my house; well knowing that no man could bring your work to a completion but myself. Also, being a prisoner in their hands, the Seigneur de Burie, the Seigneur de Jarnac, and the Seigneur de Ponts, took great trouble to cause me to be delivered, with the design that your work might be completed. Seeing which, those who hated me, sent me at night by by-roads to Bourdeaux, without having regard either to your highness or to your work: a thing that I thought very strange, seeing that Monsieur the Count de la Rochefoucault, although, at the time, he took part with your adversaries, yet, nevertheless, he showed so much honour to your highness, that he would never permit any violent entry to be made into my workshop, because of your work. But the above mentioned of this town acted not thus; but, on the contrary, directly I was made a prisoner, they broke into and made a public place of part of my workshop, and had resolved, in their town-hall, to pull my workshop down, of which a part had been erected at your expense; and would have executed such a resolution, had there not been the Seigneur and Dame de Ponts, who prayed the above mentioned not to fulfil their design.

I have written to you all these things, in order that you might not be of opinion that I had been imprisoned as a thief or murderer. I know how well you will be able to remember these things in the fitting time and place, and how much more your work will cost you for the wrong that has been done towards you in my person: at the same time, I hope that, following the counsel of God, you will return them good for evil, which is my desire; and, on my part, and according to my power, I will endeavour to be regardful of the good which it has pleased you to do to me. Which is the place where I will pray the Lord God, monseigneur, to give you, in perfect health, long and happy life.

Your very humble and affectionate servant,

BERNARD PALISSY.

TO THE READER—SALUTATION.

FRIEND READER,

Since it has pleased God that this writing should be fallen now into your hands, I pray you be not so indolent or rash as to content yourself with the reading of the beginning, or a part thereof; but, in order to carry away from it some fruit, take pains to read the whole, without having regard to the littleness and abject condition of the author, nor yet to his language, rustic and ill adorned, assuring yourself that you will find nothing in this writing which is not of profit to you, more or less; and the things which, at the beginning, will seem to you impossible, you will find them at last true and easy to be believed. Above all things, I pray you to call to mind a passage which is in the Holy Scripture, there where St. Paul says, that each one according as he

has received gifts, should distribute thereof to others. Following which, I pray you to instruct the labourers, who are unlettered, that they may be made able carefully to study in natural philosophy, according to my counsel; and, especially, let that secret and precept which concerns manure-heaps, that I have put into this book, be divulged and made manifest to them; and that also, so long as may be needed, till they hold it in as high esteem as the thing merits. Since so it is, that no man could estimate how great the profit in France would be, if on this subject they would accept my counsel. There is in certain parts of Gascony, and some other regions of France, a kind of earth called marl, with which the labourers manure their fields, and say that it is of more value than dung. Also they say, that when a field has been manured with the said earth, it will suffice for ten years.

If I see that my writings are not despised, and that they are put in execution, I shall take pains to seek for the said marl in this region of Xaintonge, and will make *a third book*,* by which I will teach all people to know the said marl, and even the method of applying it to fields, according to the way of those who are accustomed to its use. I know that they who hate me, will not approve my work, nor will the malicious and ignorant, for they are enemies to every virtue. But to be justified against their calumnies, envies, and detractions, I will call to witness all the most cultivated minds of France, philosophers and men who live well, full of

* In his last publication (which is his third book, but only the second to which Palissy attached his name) there is an essay which fulfils this pledge.

virtue and good manners, who, I know, will hold my work in their esteem, though it be written in a language rustic and ill-polished; and if they meet with a fault, they will know very well how to allow for the condition of the author.

I know that some ignorant men will say that it would need the power of a king to make a garden according to the design that I have put in this book; but to this I reply, that the expense would not be so great as some might think. And also, it must be understood, that just as in a book of medicine there are divers remedies as there are divers maladies, and each man takes according to his need, according to the diversity of complaint, so, in like case, out of the design for my garden individuals might draw according to the bearings and conveniences of the spots which they inhabit. I know, also, that many will laugh at the design of the fortified town, which I have put into this book, and will say that it is reverie; but to this I reply, that if there be any lord knight of the orders, or other captains, so far curious to know the truth of it, and meaning to be neither slaves nor subjects to the power of their money, but to use it for the contentment of their minds, let them part with a little of it to obtain understanding by picture and model of the truth of the thing. I know that they will find strange that I have not put into this book the picture of the said garden, nor yet of the fortified town; but to this I reply, that my indigence and the occupation of my art would not permit it.

I have also found so much ingratitude in many persons, that this has caused me to restrain myself from too great liberality; at the same time, the desire I have toward

the public good will incite me some day to take an opportunity of making the picture of the said garden, according to the tenour and design written in this book. But I would like to beg of the nobility of France, that after I shall have occupied my time to do them service, it will please them not to return me evil for good, as the Roman ecclesiastics of this town have done, who have desired to get me hung, for having sought on their behalf the greatest good that could accrue to them, which is, for having wished to incite them to feed their flocks, following God's commandment. And no man can say that ever I have done them any wrong; but because I urged upon them their perdition, according to the eighteenth of the Apocalypse, seeking thus to amend them; and because many times, also, I had shown to them a text, written in the Prophet Jeremiah, where he says: "Woe unto you, pastors, who drink the milk and wear the wool, and leave my sheep scattered upon the mountains! I will demand them again of your hands;" they seeing such a thing, instead of amending, hardened themselves, and banded themselves together against the light, in order to walk the remainder of their days in darkness, following the luxuries and carnal desires to which they were accustomed.

I never should have thought that, for that cause, they would have wished to take occasion to put me to death. God is my witness, that for the evil they have done to me, they have had no other occasion than the above named. This notwithstanding, I pray to God that He will better them. Which will be the place where I will pray each one who shall see this book, to make himself a friend of agriculture, according to my first

discourse, which is a just toil, and worthy to be prized and honoured; also, as I have above said, that the simple may be instructed by the wise, in order that we may none of us be rebuked at the last day for having hidden talents in the earth, inasmuch as we know that they by whom they shall have thus been hidden, will be banished from the eternal kingdom, from before the face of Him who lives and reigns eternally, world without end. Amen.

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